

THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
PUBLIC HEALTH SERVICE  
CENTERS FOR DISEASE CONTROL AND PREVENTION  
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

convenes the

WORKING GROUP MEETING

ADVISORY BOARD ON  
RADIATION AND WORKER HEALTH

BLOCKSON CHEMICAL

The verbatim transcript of the Working  
Group Meeting of the Advisory Board on Radiation and  
Worker Health held telephonically on August 28,  
2007.

*STEVEN RAY GREEN AND ASSOCIATES  
NATIONALLY CERTIFIED COURT REPORTING  
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### TRANSCRIPT LEGEND

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-- (sic) denotes an incorrect usage or pronunciation of a word which is transcribed in its original form as reported.

-- (phonetically) indicates a phonetic spelling of the word if no confirmation of the correct spelling is available.

-- "uh-huh" represents an affirmative response, and "uh-uh" represents a negative response.

-- "\*" denotes a spelling based on phonetics, without reference available.

-- (inaudible)/ (unintelligible) signifies speaker failure, usually failure to use a microphone.

## P A R T I C I P A N T S

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BURGOS, ZAIDA, NIOSH  
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TOMES, TOM, NIOSH

## P R O C E E D I N G S

(10:00 a.m.)

WELCOME AND OPENING COMMENTSDR. LEWIS WADE, DFO

DR. WADE: Hello out there. This is the work group conference room. Is there anyone with us on the telephone?

UNIDENTIFIED SPEAKER (by Telephone): Yes.

DR. WADE: Okay, thank you. As long as we know it's working, we'll start with our formal introductions. This is Lew Wade, and I have the privilege of serving as the Designated Federal Official for the Advisory Board. And this is a meeting of the work group of the Advisory Board. This is the work group on Blockson Chemical SEC, Special Exposure Cohort. That work group is chaired by Wanda Munn, members Roessler, Melius and Gibson. Munn, Roessler and Melius are in the room with us.

Is Mike Gibson on the phone?

(no response)

DR. WADE: Mike, are you with us? Mike

1 Gibson?

2 (no response)

3 **DR. WADE:** That doesn't limit our ability to  
4 proceed. What I would ask, are there any  
5 other Board members on the phone? Any other  
6 Board members not part of the work group that  
7 are on the telephone?

8 (no response)

9 **DR. WADE:** Other Board members?

10 (no response)

11 **DR. WADE:** Okay, we don't have a quorum of  
12 the Board, which is important. If we did,  
13 we'd have to take steps to remedy that. So we  
14 can proceed.

15 What I'd like to do is go around the  
16 table here and have each introduce. And for  
17 the participants of the NIOSH/ORAU team or the  
18 SC&A team, I'd also like to, you to identify  
19 whether you have any conflicts relative to the  
20 Blockson site. Board members can do that as  
21 well.

22 I have two special introductions to  
23 make before we begin, and that is I have Dr.  
24 Christine Branche with me. As I mentioned  
25 previously, Dr. Branche will be working with

1 me, understudying me, and eventually the plan  
2 is that she'll take my role at some time in  
3 the future. And then on my right I'll let you  
4 say your name so I don't mispronounce it.

5 **MS. BURGOS:** Zaida, Zaida Burgos.

6 **DR. WADE:** Zaida Burgos, who will be taking  
7 on LaShawn's responsibilities and, in fact, an  
8 expanded role in serving the Board. And we  
9 have wonderful expectations of the service  
10 Zaida will be able to bring to the Board. So  
11 with those as early introductions, again, I'm  
12 Lew Wade. I serve the Board and work for  
13 NIOSH.

14 **MR. ELLIOTT:** Larry Elliott, I'm the  
15 Director of NIOSH's Office of Compensation  
16 Analysis and Support. And I have no conflicts  
17 regarding Blockson Chemical.

18 **DR. ROESSLER:** Gen Roessler, member of the  
19 Board.

20 **MR. THURBER:** Bill Thurber from SC&A, I have  
21 no conflicts regarding Blockson.

22 **DR. NETON:** Jim Neton from NIOSH, no  
23 conflicts.

24 **MR. TOMES:** Tom Tomes from NIOSH, I have no  
25 conflicts with Blockson.



1           **MS. MUNN:** Wanda Munn, Board and chair of  
2 this working group, no conflicts.

3           **DR. WADE:** John, we're doing introductions.

4           **MS. MUNN:** John is back.

5           **DR. MAURO:** John Mauro, SC&A, no conflicts.

6           **DR. WADE:** Now Dr. Melius has stepped out  
7 for a moment. I don't see him. He's a Board  
8 member, a member of this working group and has  
9 no conflicts at Blockson.

10                   Let me go out onto the telephone and  
11 ask if there are other members of the  
12 NIOSH/ORAU team who are on the telephone to  
13 identify themselves.

14                   (no response)

15           **DR. WADE:** Jim, are you expecting anyone  
16 else to be?

17           **DR. NETON:** No.

18           **DR. WADE:** Any other members of the SC&A  
19 team on the telephone?

20                   (no response)

21           **DR. WADE:** John, are you expecting any?

22           **DR. MAURO:** No.

23           **DR. WADE:** What about other federal  
24 employees who are on the call by virtue of  
25 their federal employment? Other feds that are

1 working today.

2 **MR. KOTSCH (by Telephone):** Jeff Kotsch,  
3 Department of Labor.

4 **DR. WADE:** Welcome.

5 **MR. BROEHM (by Telephone):** And this is  
6 Jason Broehm in the CDC Washington office. I  
7 just joined the call.

8 **DR. WADE:** Welcome, Jason.

9 Other feds?

10 (no response)

11 **DR. WADE:** What about members of Congress,  
12 their staff or representatives?

13 (no response)

14 **DR. WADE:** Are there any workers or worker  
15 representatives on the call? Petitioners?  
16 Workers?

17 (no response)

18 **UNIDENTIFIED SPEAKER (by Telephone):** Yes.

19 **DR. WADE:** Would you like to identify  
20 yourself?

21 **UNIDENTIFIED SPEAKER (by Telephone):** No.

22 **DR. WADE:** Thank you.

23 Is there anyone else on the call who  
24 would like to identify themselves?

25 Okay, Wanda.

1                   One brief caution about telephone  
2                   etiquette, although we have a very small group  
3                   today. Remember that for this group to be  
4                   able to participate fully with those on the  
5                   phone, it's important that you observe some  
6                   rules, those of you on the telephone. If  
7                   you're speaking, speak into a handset and  
8                   don't use a speaker phone.

9                   If you're not speaking, mute the  
10                  instrument that you're dealing with so we  
11                  don't hear background noise, and be  
12                  particularly mindful of background noise at  
13                  your location. Sometimes people will put the  
14                  phone on hold and we get Muzak, and that's  
15                  very distracting for us. The older of us  
16                  appreciate it. It puts us to sleep and  
17                  sometimes those naps are helpful.

18                 We do have Dr. Melius. No, we don't  
19                 have Dr. Melius with us. Now we have Emily.  
20                 Introduce please.

21                 **MS. HOWELL:** Emily Howell, HHS.

22                 **DR. WADE:** Wanda, you can begin.

23                 **MS. MUNN:** As a first issue, are there any  
24                 additions or revisions to the agenda which I  
25                 forwarded to each of you by e-mail earlier

1           this week?

2           (no response)

3           **DR. WADE:** Let me see if I can secure  
4           Melius.

5           **INTRODUCTION BY CHAIR**

6           **MS. MUNN:** If not, then we'll proceed to  
7           address the limited number of issues that are  
8           before us. Originally, our contractor had  
9           brought to us six specific findings of their  
10          review of our TBD and two secondary issues.

11          In each case those had been resolved  
12          with only two remaining outstanding issues.  
13          The primary one revolves around the thorium  
14          issue, what transpires with the raffinate.  
15          How much thorium does and does not stay with  
16          the uranium as it goes through the process at  
17          the Blockson Chemical Company.

18          If that issue is adequately resolved,  
19          then the other minor outstanding issues will  
20          fall into place because they are all  
21          intimately connected to what happens to the  
22          thorium.

23          **THORIUM ISSUE**

24                 I propose to begin this discussion by  
25                 asking NIOSH to comment on the report that was

1 given to us by Dr. Elzerman. That's Elzerman,  
2 isn't it? An R. And the response to Dr.  
3 Mauro's e-mail memo of the 20<sup>th</sup>. I don't know  
4 which of you gentlemen wants to address that  
5 issue first.

6 **DR. NETON:** Well, if I might, I might  
7 suggest it would be better if SC&A would  
8 provide their commentary on the fate of the  
9 Thorium-230, and then we could take it up from  
10 there.

11 **MS. MUNN:** I would appreciate that. I would  
12 also appreciate having on the record a little  
13 bit of background with respect to how the  
14 individuals were chosen to give us the report  
15 on the chemistry. I was a little surprised  
16 when I read that report because it was not  
17 what I had anticipated coming out of the  
18 Blockson meetings with the workers.

19 I had thought that what we were doing  
20 was looking for some very specific responses  
21 from chemical experts who could tell us with  
22 some degree of authority what could be  
23 expected. I found more of a review of the  
24 literature and not nearly as much specificity  
25 as I had expected out of that report. I was

1                   also a little surprised that our contractor's  
2                   report was cited as one of the authorities for  
3                   their information.

4                   So with that having been said, any  
5                   information that anyone can give me with  
6                   respect to the selection of these individuals,  
7                   whether the charge that was given to them was  
8                   more extensive than was actually given in the  
9                   report which we got back -- please.

10                  **DR. NETON:** Maybe Tom can speak more to the  
11                  --

12                  **DR. WADE:** Before we begin, Mike Gibson is  
13                  now with us.

14                  Mike, you have no conflict with regard  
15                  to Blockson. Is that correct?

16                  **MR. GIBSON (by Telephone):** Right.

17                  **DR. WADE:** Okay, thank you.

18                  **MR. TOMES:** Yes, our contractor, ORAU, had,  
19                  George Fargo, was given the task of looking at  
20                  this issue for us. And we, through  
21                  conversations we've had with him, we thought  
22                  that it would be appropriate to have a expert  
23                  in the field look at the Blockson chemistry,  
24                  thorium specifically. And there was a few  
25                  individuals identified. One of the

1 individuals that was identified who has  
2 published a number of papers was not available  
3 and could not meet our schedule we were  
4 looking for. And Dr. Elzerman was one of the  
5 people who was recommended, and he's also  
6 involved (unintelligible) industry. And he  
7 was available and could meet our schedule  
8 roughly that we were looking for. Not as fast  
9 as we would have liked to have it, but he  
10 could do the work. And that is the reason  
11 that he was selected because he had experience  
12 in the field, and he had credentials where he  
13 published and studied the industries.

14 As far as the task he was given, his  
15 report is pretty much, and I won't say it's  
16 verbatim, but it's pretty much identical to  
17 the task he was given in the statement of work  
18 from ORAU. He was simply asked to look at the  
19 uranium. What could have (unintelligible)  
20 with the uranium. It was identified as an  
21 issue by SC&A in the review.

22 And he also was asked to strictly look  
23 at thorium in Building 55 and what behavior  
24 that may have been in the chemistry. And part  
25 of that I think was being able to take many

1 references that are out there that's to  
2 evaluate the past and have an expert opinion  
3 to interpret all those references. And that  
4 was one of the things that we wanted to see in  
5 that report. And that is pretty much what he  
6 gives.

7 **MS. MUNN:** It is, yes.

8 John?

9 **DR. MAURO:** Yes.

10 **DR. MAKHIJANI (by Telephone):** John, before  
11 you start. This is Arjun. I just joined a  
12 minute or so.

13 **DR. MAURO:** Okay, Arjun.

14 I'll sort of set the stage a bit of  
15 what we did, and probably I'd like to turn it  
16 over to Bill who really was, Bill Thurber, who  
17 you folks may have just met, who led the  
18 effort.

19 The bottom line is we had, when the  
20 thorium issue emerged and we originally  
21 identified it, there's some history here.  
22 There are a series of documents. We don't  
23 have to go all the way back.

24 **MS. MUNN:** No, no, we don't.

25 **DR. MAURO:** But in the end, in the end where



1 we merged was that NIOSH in their most recent  
2 version of their site profile addressed our  
3 concerns regarding Thorium-230 by saying that,  
4 well, as you process the uranium, the thorium  
5 goes with the uranium, and in the end there's  
6 this big 55 gallon drum filled with uranium  
7 and all the Thorium-230 is sitting there also.

8 And we felt that that was certainly  
9 could be a very reliable, genuine claimant-  
10 favorable approach except for one possibility.  
11 And that is if for some reason along the way  
12 when you start with the original ore, and you  
13 go through all the chemistry, and at the back  
14 end of the process you come out of this 55  
15 gallon drum yellowcake, is it possible that  
16 somewhere along the line the nature of the  
17 chemistry was such that the Thorium-230 would  
18 part ways from the uranium.

19 And if it does, does it part ways in a  
20 way that could actually have higher  
21 concentrations in terms of curies per gram  
22 than it would in the 55 gallon drum? Because  
23 if it could, and it could become airborne,  
24 then in theory that's a scenario where a  
25 worker who might be handling that waste

1 stream, that raffinate, whatever it is, could,  
2 in theory, experience higher exposures to  
3 Thorium-230 airborne than the worker who was  
4 handling the can of uranium. And we didn't  
5 have an answer to that.

6 So what we did is we had two  
7 individuals with our organization. One is Dr.  
8 Bill Richardson, coincidental name, who is a  
9 professor at Auburn University, inorganic  
10 chemist, and independent of that, Janet  
11 Schramke, who is also a geochemist,  
12 independently looked at it.

13 And it turns out that the nature of  
14 the problem has to do with, you know, you  
15 start off with the ore, and you go through  
16 these steps where, in effect, you're changing  
17 the pH, and you're causing various materials  
18 to precipitate out, some materials to stay in  
19 solution, and there's an ongoing process of  
20 dissolution and re-precipitation. So that in  
21 the end you get as pure a product of uranium  
22 as you can.

23 Now along this sequence of events, and  
24 I'm going to ask Bill to go into it a little  
25 bit, the question that was raised, really more

1 of a question was a concern that in our  
2 opinion it did not appear to be self-evident  
3 that the thorium will, in fact, go all the way  
4 through this process and end up in the 55  
5 gallon drum. And there are particular nodes  
6 in the process where the nature of the  
7 chemistry was such that it could have parted  
8 ways.

9 Now we're not saying that if that  
10 happened, in fact, our feelings are it  
11 probably did part ways, but whether or not  
12 that resulted in an outcome that had a greater  
13 potential for a thorium exposure than the one  
14 that was used, we don't know. And I guess the  
15 next step would be, I guess, I would ask -- by  
16 the way, in the process we were able sort of  
17 like the eleventh hour to -- I don't know if  
18 everyone got a copy of this memo that I sent  
19 Wanda. I'm not sure what the distribution was  
20 -- where we reviewed Dr. Elzerman's report.  
21 And the bottom line as best I can tell, Dr.  
22 Elzerman was asked by NIOSH to take a look at  
23 this very same question. It reads to me that  
24 he came out more or less in the same place we  
25 did.

1           **DR. NETON:** Not exactly.

2           **DR. MAURO:** Not exactly, and it's important  
3 that we understand that difference in there.  
4 But it was sort of in the same theme. It  
5 wasn't that clean cut. That's where we come  
6 out.

7                       Now with that as an introduction what  
8 we can do if you like, I made copies of a flow  
9 diagram that many of you may have seen before  
10 in some of the documents. I made 20 copies.  
11 And Bill could explain the places along the  
12 flow diagram where the uranium and the thorium  
13 may have parted ways, and if it did, what the  
14 possible implications are from a dosimetric  
15 point of view. And then maybe at that point  
16 you folks, we can say, we can understand if  
17 there is any disagreement. And if there is,  
18 what its possible significance is. Is that a  
19 plan?

20           **MS. MUNN:** That's feasible to me, and one of  
21 the things that would be helpful for me also  
22 is if you could tie the diagram that you have  
23 in your hand, John, to the one that was in  
24 Elzerman's report.

25           **DR. MAURO:** I think it's the same one. It

1 is the same one.

2 MS. MUNN: Is it?

3 DR. MAURO: It should be. Oh, no, it's  
4 different.

5 MR. TOMES: It's not the same one.

6 MS. MUNN: For those of us who are not  
7 chemists it would be helpful, I think --

8 DR. MAURO: Would you prefer to work with  
9 that one?

10 MS. MUNN: No, no, the one that you have is  
11 just fine. We've seen both of them, and  
12 having seen both of them --

13 DR. NETON: This one is in the TBD. It's in  
14 the site profile.

15 DR. MAURO: We found it very useful.

16 MS. MUNN: That being the case since it  
17 varied from the data capture discovery review  
18 document that we had from Dr. Elzerman, I made  
19 a preliminary attempt to match the two of them  
20 in my visual framework and had a little bit of  
21 difficulty following the two. That's why I  
22 asked. We'll rely on the one that was in the  
23 TBD that you've just passed around unless we  
24 have indication that there's a major  
25 difference in the two. And I'm assuming that

1                   you're going to be able to tell us that,  
2                   right?

3                   **MR. TOMES:** To my knowledge there's no major  
4                   difference in the two.

5                   **MS. MUNN:** Okay, Bill?

6                   **MR. THURBER:** I think if you start at the  
7                   top line there, the Blockson monosodium  
8                   phosphate process, during this step the pH of  
9                   the solution is raised from a very low value  
10                  for the phosphoric acid to a pH of about four.  
11                  And that is done here with sodium hydroxide or  
12                  sodium carbonate.

13                  And it's not clear which reagent was  
14                  used although in the Elzerman Report, he chose  
15                  to assume that it was sodium hydroxide. There  
16                  was other evidence provided and included in  
17                  the Elzerman Report that says that Blockson at  
18                  the time was purchasing large quantities of  
19                  sodium carbonate so it could be either one.

20                  We don't think it makes a great deal  
21                  of difference. If it was sodium carbonate, it  
22                  would probably increase the solubility of the  
23                  thorium passing out of this box on the flow  
24                  sheet, if you will, because of the possibility  
25                  that the thorium might form some complexes

1 with the carbonate ion. But we identified  
2 previously, and as did Elzerman, the  
3 possibility that some thorium would be  
4 precipitated during this set because as the pH  
5 is increased to about four, the Blockson  
6 literature notes that a number of species such  
7 as iron and calcium and so forth do  
8 precipitate.

9 And there is a possibility that some  
10 of the thorium may precipitate there. And I  
11 think both we and Elzerman identified this as  
12 one point where the thorium might be removed  
13 in a waste stream. Now whether it is  
14 concentrated in that waste stream, we can't  
15 say. We just don't, there's not enough  
16 information on the chemistry to come up with  
17 any really positive conclusion as to the  
18 concentration.

19 **DR. NETON:** Where would this precipitate out  
20 and be removed from the process though? I  
21 don't see a filtration step here or --

22 **MR. THURBER:** But if you look at the  
23 Elzerman document, I believe he includes that  
24 in there.

25 **DR. ROESSLER:** Where does it happen on this

1 diagram?

2 **MR. THURBER:** Monosodium phosphate is a box  
3 which embraces several unit operations. It's  
4 a great oversimplification of what happened in  
5 that process because what actually happened in  
6 the process is you add a base. You increase  
7 the pH; species are precipitated, and they are  
8 filtered and disposed of. So those steps all  
9 occur in that box, but they don't show in the  
10 flow diagram.

11 **DR. ROESSLER:** And so it doesn't show where  
12 the other route would go if it doesn't go with  
13 the phosphate liquid.

14 **MR. THURBER:** No.

15 **DR. NETON:** But in your opinion as a  
16 professional chemist, would that likely be a  
17 quantitative separation of Thorium-230 at that  
18 point? I mean, you're talking --

19 **MR. THURBER:** No, no, we think it's probably  
20 small quantity --

21 **DR. NETON:** Very small quantity, that's  
22 important though.

23 **MR. THURBER:** I didn't say very small. We  
24 don't know.

25 **DR. NETON:** That's important though. It's



1 not a quantitative separation where one would  
2 have pure Thorium-230 in these filters.

3 **MR. THURBER:** We do not believe that to be  
4 the case, no.

5 **MS. MUNN:** And frankly, this is one of the  
6 kinds of issues that I was disappointed in  
7 with respect to the report. I would really  
8 hope that we would have a clearer definition  
9 of what the possibilities were. What the  
10 probabilities were.

11 **MR. THURBER:** There's just not enough  
12 information on the chemistry, and what they  
13 actually did. We thought, we looked at the  
14 FUSRAP Report, and it had in there some  
15 measurements of the thorium content of the  
16 disodium phosphate. I thought, gee, this is  
17 good, but it's totally irrelevant because that  
18 was done at a later time when presumably they  
19 were making a different end product than the  
20 monosodium phosphate that was being produced  
21 at the time of the uranium recovery.

22 So to repeat, unfortunately, the  
23 available information on chemistry just is not  
24 good enough to predict what we would all like  
25 to be able to predict about the concentration

1 of the thorium in that strip. We think it's  
2 small, but beyond that we can't say.

3 **MS. MUNN:** I would have liked to have been  
4 able to say if were carbonate, then this is  
5 what you would expect. If it were phosphate,  
6 then this is what you would expect.

7 **MR. THURBER:** All we can say is  
8 qualitatively if it was carbonate, then less  
9 would have been removed at that step. But  
10 that's very quantitatively.

11 **MR. TOMES:** One thing. There are a couple  
12 references that did use the carbonate. There  
13 is a couple references that they did.

14 **MR. THURBER:** I'm sorry?

15 **MR. TOMES:** There are a couple references  
16 that they used soda ash, the carbonate for the  
17 neutralization.

18 **MR. THURBER:** Yes, indeed, and I pointed  
19 out, but that was not the assumption that  
20 Elzerman made. He assumed it was sodium  
21 hydroxide. But it was the view of our people  
22 that it was not a substantive difference which  
23 reagent you assume. Small difference, not  
24 substantive.

25 **DR. NETON:** I think your point is there

1                   wouldn't be much difference, and you agreed  
2                   that it would be a small separation, not a  
3                   very quantitative concentration step. And at  
4                   this point as far as I could tell, what we put  
5                   into the drum isn't more highly concentrated  
6                   than this stuff would have produced.

7                   See, we have to keep in mind the end  
8                   product of what we ended up putting into the  
9                   drum and how concentrated that was relative to  
10                  all these different steps where there may have  
11                  been some separation. We don't disagree with  
12                  that. But you have to look at the end product  
13                  of what we dumped into the drum and exposed  
14                  the workers to on a chronic basis versus the  
15                  small potential separation.

16                 I've done a lot of (unintelligible)  
17                 chemistry in my earlier days working with  
18                 (unintelligible), and I know that it's  
19                 somewhat difficult to separate thorium from  
20                 uranium. You have to work --

21                 **MS. MUNN:** Really hard.

22                 **DR. NETON:** -- not really hard, but it's  
23                 not, you have to do some special things to  
24                 make sure thorium is removed so you don't have  
25                 thorium contamination uranium end product. So

1           that's why I'd be interested to hear in these  
2           various chemical steps where those  
3           quantitative separation steps would have  
4           happened. If they were like --

5           **MR. THURBER:** As we said, we cannot --

6           **DR. NETON:** But I think you can make some  
7           value judgment as to how concentrated it could  
8           have been in each of these steps. And that's  
9           what I'm interested in.

10          **MR. THURBER:** The other point where there's  
11          a small difference I believe, and again, I  
12          believe it is not a substantive difference, is  
13          that we think there's, if you look on the  
14          diagram, you'll see next to the filter box  
15          filtrate return to the monosodium phosphate  
16          production kind of on the second tier of the  
17          figure.

18          **DR. MAURO:** Left-hand side?

19          **MR. THURBER:** Yeah, you'll see a caption  
20          there. It says filtrate returned to  
21          monosodium phosphate production. We think,  
22          again, that there's a possibility that not all  
23          of the thorium was precipitated with the  
24          uranium at that point. And so some of it was  
25          returned downstream to whatever Blockson did

1 with the material. Again, we don't think it's  
2 a quantitative separation in your terms, but  
3 we think there's a possibility that some  
4 thorium may have gone in that direction.

5 **DR. ROESSLER:** Let me ask you a question.  
6 There where it says filtrate returned to  
7 monosodium phosphate production is the one  
8 you're talking about. Does that mean it  
9 recycles through the process?

10 **MR. THURBER:** Well, it ends up in the end  
11 product where it's not concentrated  
12 presumably.

13 **DR. ROESSLER:** This makes it sound like it  
14 goes back up and goes back through --

15 **DR. NETON:** No, this will go back out of the  
16 plant.

17 **MR. THURBER:** You have to take product out  
18 at some point. That's what you're trying to  
19 do is make a product to package and sell.

20 **DR. MAURO:** You know how it helped me to  
21 think about this? The way I visualize this or  
22 I'm reading this is that you have this  
23 operation ongoing where they were making  
24 monosodium phosphate. This was what they did  
25 commercially.

1                   And they had this system, and they  
2                   knew that the whole system was such that when  
3                   they finished their product, the uranium  
4                   stayed in the system. And they wanted to  
5                   build a kidney, in other words, they wanted to  
6                   stick on to this process that was making  
7                   monosodium phosphate a way to bleed off the  
8                   uranium because that was a special product  
9                   they want. So what this step is, the one that  
10                  Bill just pointed to is, in effect, what they  
11                  just did is go through that kidney.

12                 In other words they sent the  
13                 phosphoric acid which contained the sulfur,  
14                 the phosphoric acid with the uranium, with the  
15                 thorium into this kidney, the side stream.  
16                 And then they returned the monosodium  
17                 phosphate, the arrow going to the left, to  
18                 back where it started from to resume their  
19                 normal commercial production.

20                 **DR. ROESSLER:** It doesn't go back through --

21                 **DR. MAURO:** And what it looks like to me is  
22                 that here's a place where when they, that  
23                 little box called filter just to the right of  
24                 that, that's where all the action is. That's  
25                 where they're tweaking the pH or the

1 (unintelligible) or whatever so that we can  
2 pull the uranium out but let the monosodium  
3 phosphate stay in solution and go back to  
4 where Building 44 wherever they were doing  
5 their normal thing.

6 And the question becomes at that  
7 tweaking spot, there may very well have been  
8 good reason, maybe reason to believe that some  
9 of the uranium -- I'm sorry -- some of the  
10 thorium may have gone off in that direction.

11 Correct me if I'm right, Bill. I  
12 don't believe that issue was addressed in the  
13 Elzerman Report, that possible option. And I  
14 guess our folks felt that that was a  
15 possibility, which by the way, the only reason  
16 I bring it up is if, in fact, there was some  
17 substantial amount of thorium that stayed in  
18 the liquid that went to the monosodium  
19 phosphate process. What happens there, well,  
20 we don't know. It may stay and be diluted in  
21 this enormous volume of the phosphate product.  
22 Or it may have come out in some purification  
23 step.

24 You could correct me if I'm wrong.

25 So there's an unknown there if some of

1                   it did go that way.

2                   **MR. TOMES:** Let me ask you about the  
3                   Elzerman Report. I believe he did not  
4                   specifically address the monosodium phosphate  
5                   that was returned to, but he did evaluate that  
6                   step in the process.

7                   **DR. MAURO:** Okay.

8                   **MR. TOMES:** He did do that.

9                   **DR. MAURO:** Did he come out saying that that  
10                  might have been, that the thorium might have  
11                  been --

12                  **MR. TOMES:** He did not identify that as any  
13                  significant --

14                  **DR. NETON:** Again, I don't know if this  
15                  would be a quantitative separation of thorium.  
16                  Here again, I view these as sort of chemical  
17                  losses in the recovery of thorium. If one  
18                  were trying to recover thorium --

19                  **DR. MAURO:** You're going to lose some over  
20                  there.

21                  **DR. NETON:** -- you're trying to recover  
22                  uranium, but let's say that the chemistry is  
23                  sufficiently similar that the thorium will  
24                  track the uranium for the most part. I think  
25                  we all agree with that. And you're going to



1           have some line losses, so to speak, along the  
2           way. And we don't disagree with that.

3           **MR. THURBER:** And I think that's a  
4           reasonable perspective to put on it, just what  
5           he said.

6           **MS. MUNN:** But the concern for those of us  
7           who are not physical chemists is how  
8           significant is that loss? How significant  
9           would the thorium exposure be? And the  
10          frustrating part of it from my perspective is  
11          I didn't get that out of the report. I had  
12          hoped to try to get at least a range out of  
13          the report, and we didn't get it. But I don't  
14          mean to interrupt.

15                 Just want to make sure -- Dr. Melius  
16          has joined us at the table. Did you get a  
17          copy of this, of the pass around?

18          **DR. MELIUS:** I've been here for quite  
19          awhile, Wanda.

20          **MS. MUNN:** Well, I know you have. This is  
21          the first opportunity I've had to mention that  
22          you're back, and I wanted to make sure that  
23          you had the handout.

24          **DR. MELIUS:** Yes, I do. Thanks.

25          **MS. MUNN:** I'm sorry. Go ahead, Bill.

1           **MR. THURBER:** Well, I think that really  
2 pretty much summarizes it.

3           **DR. MAURO:** There was one more step in the  
4 back end if I recall. There's a purification  
5 process for the uranium. That's sort of  
6 weighted down in the throw. You almost  
7 envision, okay, now we've got, at that step  
8 where you see the filter and to the left of  
9 the word filter it says filtrate returned to  
10 monosodium, at the filter, here's where you're  
11 pulling the uranium out. Here's where the,  
12 you're finally making a product of uranium.  
13 But the uranium itself is not very purified.  
14 So as I understand it there's a series of  
15 steps of dissolution and re-precipitation  
16 along the way to try to get as pure a product  
17 as you can.

18           **MR. THURBER:** That's right.

19           **DR. MAURO:** It was my understanding that  
20 during that process somewhere along the way  
21 there was another opportunity for the thorium  
22 to go separate ways. The degree to which it  
23 could occur I wish we had better answers for  
24 you.

25           **DR. NETON:** But I think we can say there's

1                   probably not a quantitative separation again  
2                   at that point.

3                   **DR. MAKHIJANI (by Telephone):** Could I ask a  
4                   question? This is Arjun. Isn't part of the  
5                   question here the ratio of uranium and thorium  
6                   rather than the amounts of thorium which go  
7                   off into the raffinate stream? Because the  
8                   amount of uranium in the raffinate streams  
9                   would also be an issue even if most of the  
10                  thorium goes off with the uranium.

11                  The ratio of thorium to uranium in the  
12                  raffinate streams may be much bigger. I think  
13                  given that we have uranium bioassay but not  
14                  thorium measurements, I think the ratio would  
15                  be important. Perhaps I'm wrong, but that's  
16                  the question that seems to me central.

17                  **DR. NETON:** I'm not sure, Arjun.

18                  **DR. MAURO:** Let me jump in. I think I  
19                  understand, and I think that that's a valid  
20                  concern. Think of it like this. You've got  
21                  this 55 gallon drum of uranium. And let's for  
22                  the sake of this discussion assume that all  
23                  the thorium for all intents and purposes ends  
24                  up in that drum. Then you say, okay, now we  
25                  have people that are filling the drum. In

1           other words you have these hoppers, and  
2           they're filling the drum. And the dust that's  
3           coming up off the process is going to be some  
4           kind of milligrams per cubic meter of dust  
5           that people are going to breathe. And that  
6           milligram is made up of uranium yellowcake and  
7           thorium in equal amounts because they're in  
8           equilibrium.

9           **DR. NETON:** Activity wise.

10          **DR. MAURO:** Activity wise, so if you've got  
11          a curie of uranium in the can, you've got a  
12          curie of Thorium-230 in the can.

13          **DR. NETON:** Exactly.

14          **DR. MAURO:** And then if you kick up a  
15          milligram, whatever the specific activity is  
16          you've got to know that you have equal amounts  
17          of, so now you have, now you're inhaling x  
18          amount of uranium and x amount of thorium. So  
19          it's the ratio. Now, let's for a second  
20          presume that it goes that route and that's  
21          exactly the method that you folks adopted so  
22          that you account for the intake of thorium.

23                 Now, Arjun's perspective is, oh, wait  
24                 a minute. Let's say for a moment that only a  
25                 small fraction, let's say 20 percent -- I'm

1 making this up -- of the thorium goes in a  
2 different direction, and it ends up in some  
3 small volume raffinate, relatively small  
4 volume raffinate. But for all intents and  
5 purposes its specific activity, the number of  
6 curies per gram of material is much higher.

7 Now I think there's a lot of curies or  
8 millicuries in that particular box that we  
9 don't have on this chart, but if it has a much  
10 higher specific activity in terms of curies  
11 per gram, even though the total curies is  
12 lower, the curies per gram might be higher  
13 even though the volume is smaller because that  
14 creates potential for the guy whose job it is  
15 to get rid of that stuff to go in, clean out  
16 that pit, wherever that side stream is  
17 generated. And if it dries out, and I guess  
18 it's a question we don't have the answer to.

19 **DR. NETON:** Let me try to put some  
20 perspective on this issue because I've thought  
21 about this some in the last week or so. We  
22 feel it's claimant favorable to put all of the  
23 thorium into the drum for several reasons.

24 One is that the processes are similar.  
25 The chemistries of thorium and uranium are

1 similar, and we've already discussed the fact  
2 that in general thorium will follow uranium  
3 unless you do some pretty specific things to  
4 try to concentrate it. We see no evidence  
5 anywhere in the plant that that occurred.

6 Now, when you dump the thorium and  
7 uranium in equal activities, uranium has an  
8 activity, Uranium-238 of about 330 nanocuries  
9 per gram. So for every gram of uranium you  
10 dump in that drum, you're also dumping 330  
11 nanocuries of thorium. That's 330 nanocuries  
12 of thorium per gram of material. That's a  
13 huge amount.

14 In fact, if you take the original  
15 input stream which is 40 picocuries per gram  
16 of each, and if you assume that you've got 100  
17 percent recovery, which is not necessarily  
18 true, but it can get that high, you have  
19 concentrated that thorium by a factor of about  
20 8,000. That's a pretty good concentration  
21 step to assume in this process, and probably  
22 not unreasonable given the similarities of the  
23 chemistry.

24 So we dumped it all in there. We  
25 concentrate it by a factor of 8,000, and we're

1 giving simultaneous exposure to both uranium  
2 and thorium to every worker on a chronic  
3 basis. I know of no other step in the  
4 production process of this material that  
5 concentrates thorium to that extent or I've  
6 not heard of any either.

7 Secondly, if one looks at the DOE  
8 history of raffinate, admittedly the  
9 chemistries could be different, but a  
10 raffinate stream that would produce 330  
11 nanocuries per gram of Thorium-230 is pretty  
12 darn high. In fact, I went back and looked at  
13 what the Thorium-230 in the raffinate at  
14 Fernald is which was a well-known raffinate-  
15 using, highly concentrated Belgian Congo ore.  
16 The entire Silo 3 at the Fernald site had  
17 about 60 nanocuries per gram of Thorium-230.  
18 So I am at a loss to think of any other step  
19 in this process that would have concentrated  
20 to a higher degree than what we put into the  
21 drum of uranium. I'm open to suggestions.

22 **DR. MAURO:** Oh, no, no, I didn't know that  
23 what you just said. And what you're saying  
24 that when you search for it, because you're  
25 processing uranium all the time. And you're

1 saying you would have to generate that kind of  
2 side stream, and you haven't seen it.

3 DR. NETON: Well, I've not seen 330  
4 nanocuries per gram generated on a basis like  
5 this.

6 DR. MAURO: Has anyone ever taken a sample  
7 of the 55 gallon drum to see what's in it?

8 DR. NETON: Of this material?

9 DR. MAURO: Yeah.

10 DR. NETON: No, I don't think so.

11 DR. MAURO: Or a similar operation to see  
12 how much thorium makes it over?

13 DR. NETON: No. But I think the point is  
14 not that did it quantitatively go. I think we  
15 all agree that it probably did. But the  
16 question is did it quantitatively concentrate  
17 anywhere to a greater degree than what we put  
18 into the drum. And that's really the relevant  
19 issue here.

20 DR. MAURO: I agree.

21 DR. ROESSLER: But what you're saying really  
22 to me is speculation. The question, which we  
23 don't have an answer to, and I think what you  
24 have to do is evaluate this ratio or whatever

25 --



1                   **DR. MAURO:** I agree.

2                   **DR. ROESSLER:** But the other thing you asked  
3 about, has anybody ever measured in the drum.  
4 Are there any measurements in these off-  
5 streams? Is there any indication from any  
6 process or anybody who's done any measurements  
7 to show that there is thorium in it?

8                   **DR. NETON:** I've looked a little bit at the  
9 Florida Institute of Phosphate Research report  
10 which they're voluminous reports, 300-page  
11 reports. I've seen nowhere in any of those  
12 reports, now, admittedly this is more current  
13 day chemistry of these phosphate products. I  
14 don't think it's fundamentally different than  
15 what happened back in '55.

16                   There is nowhere that I have seen that  
17 anyone was concerned about the presence of  
18 Thorium-230 concentrated in raffinates to an  
19 extent that we have to get to that would be  
20 higher than 330 nanocuries per gram. In fact,  
21 the most recent study in 1998 that was put  
22 out, of which Wes Bolch is one of the authors,  
23 did a fairly extensive -- extensive is  
24 probably too strong -- a reasonable survey of  
25 the chemical phosphate industry including the

1 wet chemistry process.

2 And there are air samples out in the  
3 plant where they're not seeing high airborne  
4 concentrations of materials. In fact, I think  
5 the highest concentrations they could get were  
6 about a picocurie per cubic meter of activity  
7 in the air at a location where they were  
8 actually changing out filters and such.

9 So I've not identified in the  
10 phosphate industry a place where a filter  
11 would (a) have to have a huge, more than 330  
12 nanocuries per gram of Thorium-230, and be dry  
13 and manipulated to the extent that it can  
14 generate these large air concentrations to  
15 expose the workers greater than what we've  
16 done in the drum.

17 So there's sort of a --

18 **DR. MAURO:** What you're saying is there are  
19 some powerful circumstantial evidence that  
20 says that that's just not happening. And  
21 you're not getting something worse than what  
22 you've assumed.

23 **DR. ROESSLER:** I think it's bounding what --

24 **DR. NETON:** It appears to us to be a pretty  
25 good, solid logic flow to this versus the

1           hypothetical scenarios that have been  
2           presented.

3           **DR. MAKHIJANI (by Telephone):** This is  
4           Arjun. I think maybe I didn't make my point.  
5           I wasn't understood or something. The  
6           question isn't the degree of thorium  
7           concentration from the ore to the uranium  
8           drum. I mean, anytime you process ore, you're  
9           going to get poor quality ore, you're going to  
10          get very large concentrations as the  
11          concentration factors.

12                 I think the question is the ratio of  
13          uranium to thorium in the various streams. Is  
14          the ratio of uranium to thorium in the drum  
15          bigger than the ratio of, or comparable, to  
16          the ratio of uranium to thorium in the  
17          raffinate streams. And this is not different  
18          than the problem we had in Mallinckrodt in  
19          terms of internal intakes. Although the  
20          chemistry is different, the conceptual issue  
21          is the same.

22           **DR. NETON:** But, Arjun, what I was  
23           suggesting is you have to find a mechanism  
24           where the concentration factor was higher than  
25           around 8,000.

1                   **DR. MAKHIJANI (by Telephone):** No, that's  
2 not the point, and that is what I'm trying to  
3 get across is if the ratio of thorium to  
4 uranium in the raffinate streams is 20-to-1,  
5 it doesn't really matter because you don't  
6 have a measurement of thorium. You're trying  
7 to base your thorium intake estimate from your  
8 uranium measurement --

9                   **DR. NETON:** No, no, no, what I'm saying is -  
10 -

11                   **DR. MAKHIJANI (by Telephone):** -- and it's a  
12 1-to-1 ratio in the drum. And I think the  
13 ratio's more important.

14                   **DR. NETON:** What I'm saying is picocuries  
15 per gram of material inhaled, you would have  
16 to concentrate it more than 8,000 times to get  
17 more picocuries per gram inhaled, per unit  
18 mass of material inhaled, than what we have  
19 put into the drum. I'm not considering  
20 uranium as radioactive. I'm just saying it's  
21 a gram of substance, and there are 330  
22 nanocuries of thorium per gram of material in  
23 the drum.

24                               Forget the fact that it's uranium.  
25 Now, what I'm saying is you would have to find

1 a mechanism that would produce more than 330  
2 nanocuries per gram of filtrate somewhere  
3 where it concentrates to that extent in the  
4 plant, and we just don't see that. I'm not  
5 seeing any evidence of that occurring.

6 **MR. ELLIOTT:** We have an outreach meeting  
7 that we've scheduled where we're going to  
8 speak to workers about how we have changed the  
9 site profile technical basis approach here.  
10 And is there a point in the diagram here that  
11 we should try to pursue a little better  
12 elucidation of the processes that occurred at  
13 that point or that step? Do you know what I'm  
14 trying to say here?

15 **MR. THURBER:** Yes.

16 **DR. MAURO:** Jim, I think you've nailed it in  
17 terms of what is the question. Sometimes  
18 that's the whole ballgame; what's the right  
19 question to ask. Is there any reason to  
20 believe that there are any components anywhere  
21 along here where the picocuries per gram, not  
22 uranium, picocuries per gram of matrix,  
23 material, it dried out. And is it possible  
24 that you could have more picocuries per gram  
25 of material, dry material, that is greater

1           than the picocuries per gram that's in the 55  
2           gallon drum?

3           **DR. NETON:** Exactly.

4           **DR. MAURO:** And I never thought of it in  
5           those terms. But if a case could be made, an  
6           argument could be made that says we just don't  
7           see it. We just don't see it as you had  
8           pointed out from looking at the literature.  
9           Notwithstanding you may get these  
10          bifurcations. The out product, even if it  
11          dries out, and it may not even dry out, but  
12          even if it dries out we're saying it's still  
13          going to be lower than what's in the can, the  
14          55 gallon drum. I find that to be very  
15          compelling.

16          **DR. NETON:** We may need to look at the  
17          literature a little more on this. I have not  
18          done an exhaustive search, but certainly in  
19          the raffinate processes that I'm aware of, it  
20          would be hard to get that high of a chemical  
21          separation of the thorium into a mass of  
22          material like that.

23                 Larry has an excellent point. We  
24                 intend when we go out, I think it's September  
25                 12<sup>th</sup>.

1 Tom, is that right?

2 **MR. TOMES:** Yes.

3 **DR. NETON:** We're going September 12<sup>th</sup> to  
4 Blockson, and this is certainly going to be  
5 high on our list to try to learn any  
6 additional information from the workers about  
7 these filtrate steps and mass of the filter,  
8 that sort of stuff. Because that would help  
9 me out as well.

10 If you notice, a lot of these filtrate  
11 steps have what they call filter aids and  
12 stuff which are inorganic/organic flocculent  
13 matrices to try to help precipitate the  
14 material. Because the fact is there's not  
15 much mass of Thorium-230. I mean, per gram of  
16 uranium in that drum there's a ten to the  
17 minus 13<sup>th</sup> grams of Thorium-230, the specific  
18 activity is so high for Thorium-230.

19 And it's been my experience in my  
20 earlier days as a radiochemist, if you've got  
21 little bits of material like that, it's hard  
22 to get it out of solution. You can't get,  
23 there's just sort of a process where you have  
24 to have a sufficient critical mass, not a  
25 nuclear critical mass, but a critical mass to

1 be able to precipitate quantitatively material  
2 out of solution.

3 **DR. MAURO:** You need a carrier.

4 **DR. NETON:** You need a carrier, exactly.

5 So you would need significant amounts  
6 of carrier to bring that stuff out to  
7 quantitatively isolate it in one location.  
8 Which again brings me to the fact that it's  
9 going to be hard to get more than 330  
10 nanocuries per gram of this stuff in one  
11 location.

12 **MR. ELLIOTT:** I think you also have to  
13 figure out if you can from the workers what  
14 the conditions of working with the material  
15 were. Was it a wet raffinate? Was it a  
16 slurry? Did they dry it before they removed  
17 it as a filter cake and placed it in the drum?

18 And, you know, you talk about  
19 milligrams per cubic meter, that puts a lot of  
20 dust in the air. I'm thinking more on the  
21 order of micrograms per cubic meter of  
22 exposure. So I think those kind of questions  
23 need to be pursued here.

24 **DR. NETON:** I think an 8,000 times  
25 quantitative isolation of materials is a



fairly good chemical process.

DR. MAURO: I think we're going to get to the point in this where it's going to be weight of evidence. We're going to get to the point where there's not going to be an absolute answer where we have measurements made, and we've got the definitive proof. You know, something that we all would have liked to have seen.

But what I'm hearing is the weight of the evidence in terms of the quantity of material in terms of mass and is it possible that enough thorium went into that relatively small mass to create a situation where you have much higher specific activity than in the 55 gallon drum. And it dried out, and there was enough there to create an airborne aerosol that could have been inhaled over a protracted period of time the way it was, obviously, in the 55 gallon drum.

So it's all this coming together that you would argue, well, where do you come down on this. But unfortunately, I think we're going to end up in a place where it's not going to be definitive. It's going to be

1 weight of evidence that seems to make the most  
2 sense.

3 **MS. MUNN:** You know, during the worker  
4 meetings that were held at Blockson earlier,  
5 there were several individuals who had first-  
6 hand knowledge, were actually there at the  
7 time and were able to provide a great deal of  
8 what I thought was informative data.  
9 Unfortunately, I have not seen the minutes  
10 from that particular, from the workers we had  
11 at the meeting.

12 I'm assuming that you have, Jim, and  
13 you've been on that.

14 **DR. NETON:** Yes.

15 **MS. MUNN:** I only am going from memory, from  
16 what I heard there. But I did not have the  
17 impression that there were dry processes  
18 anywhere except at the end of the line. If  
19 that's the case, then the issue should be able  
20 to be tied down a little better. Both Gen and  
21 Mike have indicated that they're going to be  
22 available for this worker, upcoming worker  
23 meeting at Blockson, which is very good. I'm  
24 glad. I'm not going to be able to be there.

25 **DR. ROESSLER:** You're glad we're going to be

1                   there since you can't be there?

2                   **MS. MUNN:** I'm glad you're going to be there  
3                   for more than one reason. One of the things I  
4                   would like to see happening going into this  
5                   meeting is I would like to have this group  
6                   define precisely the question that needs to be  
7                   asked of these workers because the previous  
8                   opportunities that they had were to tell us  
9                   their stories. And they did, in fact, do  
10                  that. It was a well-run meeting. The workers  
11                  had plenty of opportunity to speak for as long  
12                  as they wanted to about information that they  
13                  had. And they did provide excellent  
14                  information.

15                  This time, if we're going to continue  
16                  to have meetings, rather than having the  
17                  workers run open as it were, it appears to me  
18                  we're at a point where it's crucial we  
19                  identify the questions that need to be asked  
20                  and try to make every effort, ask Laurie to  
21                  make an effort to see that the people who were  
22                  there the last time or any additional people  
23                  who might have information that will bear  
24                  directly on those limited issues be asked to  
25                  be present.

1                   Can we put together, in my view, no  
2                   more than three, actually, I see only two  
3                   questions that need to be asked specifically.  
4                   Can we do that? Is it within our purview to  
5                   request of Labor that their meeting proceeds  
6                   with the concept that these are the specific  
7                   questions we need responses to?

8                   **DR. NETON:** This is our meeting. When you  
9                   said Labor, I thought you meant the Department  
10                  of Labor.

11                  **MS. MUNN:** Well, I, no, the workers.

12                  **DR. WADE:** I think it's certainly a purview  
13                  for this working group to make that  
14                  recommendation. I wouldn't limit it just to  
15                  that. You always want to give people the  
16                  floor to say anything they want, but to ask  
17                  specific questions along with an open session  
18                  I think is perfectly reasonable.

19                  **DR. ROESSLER:** I haven't been at an outreach  
20                  meeting so at any meeting who actually runs  
21                  the meeting? Is it you? It's NIOSH? So you  
22                  --

23                  **MR. ELLIOTT:** There are various purposes  
24                  behind an outreach meeting. This particular  
25                  outreach meeting's purpose is to walk out for

1 the workers a revised technical basis approach  
2 that speaks to all of the types of dose that  
3 needs to be reconstructed for this workforce.  
4 And in that we also have a purpose and an  
5 opportunity in this purpose to explore certain  
6 issues or questions that we still need an  
7 answer to.

8 So that's, so NIOSH will be leading  
9 this meeting. Yes, we'll have our contractor  
10 there to capture minutes, and we'll share  
11 those minutes with the folks who attend and  
12 make sure that we are correctly and accurately  
13 compiling what their thoughts were and their  
14 responses were.

15 **DR. MAURO:** For the record, just some of the  
16 feedback from SC&A regarding areas that we  
17 think that might be worth exploring, and it  
18 doesn't go toward talking about thorium  
19 because I don't think we're going to get much  
20 help on talking about thorium. For example,  
21 in the chart there are, I guess, three points  
22 where we'd like to know more about what went  
23 on. Something that they probably would know  
24 about because they lived it.

25 **MS. MUNN:** And we've only talked about two.

1                   So where's the third?

2                   **DR. MAURO:** I have three. The three are in  
3                   the drawing on the very, very top line where  
4                   it says the square box that says Blockson's  
5                   monosodium phosphate process. Then we've got  
6                   a more complicated box that's shown here, and  
7                   there was some separation activity going on in  
8                   there where there was some purification of the  
9                   stream where they pulled off some particulate  
10                  material to allow, the next step is the  
11                  monosodium liquor.

12                 In other words you see moving off to  
13                 the right of that box is the liquor. Well,  
14                 the question becomes right now we're operating  
15                 on the premise that all the uranium is sitting  
16                 in that liquor, and all of the thorium is  
17                 sitting in that liquor.

18                 Well, we suspect that to some degree  
19                 there's some activity going on in that box  
20                 where they're pulling off some particulate  
21                 material to help purify that stream, make it a  
22                 better stream is what they're trying to do.  
23                 The question is what did they do? In other  
24                 words what were those streams like? What did  
25                 they pull off?

1                   And the product that came out, if  
2                   those streams did exist, what did they do with  
3                   them? Did they dry them? Put them in a box?  
4                   Dispose of them? Or were they staying wet,  
5                   and they ended up some place else in some  
6                   slurry? So that's the kind of question they  
7                   probably know the answer to. They wouldn't be  
8                   able to say anything to the effect whether  
9                   thorium went that way, but if we knew that was  
10                  dry, that's point number one.

11               **MR. ELLIOTT:** And how many steps that box  
12               includes.

13               **MS. MUNN:** Yeah, what happened with it.

14               **MR. THURBER:** Was it just put down the  
15               sewer?

16               **DR. MAURO:** Or did it go down the sewer,  
17               yeah.

18                   Now the other place where I see some  
19                   action that they could talk about is the next  
20                   tier down right in the middle of the page  
21                   where you see the word filter, and then to the  
22                   left it says filtrate returned to monosodium  
23                   phosphate production. Well, that's that place  
24                   where the monosodium phosphate, the commercial  
25                   product, goes back into the commercial line.

1                   Now we believe that there's a good  
2 chance that at least some of the uranium --  
3 I'm sorry -- some of the thorium may have gone  
4 to the left. In other words at that point  
5 that's where you're getting the separation.  
6 That's where the uranium is being separated  
7 from the commercial product.

8                   Now one of the questions we have is  
9 was that separation of such a nature where  
10 some substantial amount of thorium may have  
11 gone off to the left with the monosodium  
12 phosphate production. Let's say --

13               **MR. ELLIOTT:** And does that go back into  
14 that other box we just talked about?

15               **DR. NETON:** That goes back into the plant.

16               **DR. MAURO:** That goes back into the plant  
17 because --

18               **DR. NETON:** That goes back to Building 4.

19               **DR. MAURO:** -- yeah, and that's where  
20 they're making the product. That's what they  
21 do for a living over there commercially.

22                   Now, now you've got this commercial  
23 product. And it's a large volume. This is  
24 where the volume is. This is what they're  
25 making for a living. Well, inside it possibly



1                   there's some thorium and --

2                   **DR. NETON:** But that's no different than the  
3                   regular process at this point, just that the  
4                   uranium's been removed. Which brings up  
5                   Arjun's point.

6                   **DR. MAURO:** That's correct.

7                   **DR. NETON:** This is a uranium stream's been  
8                   removed. Thorium is in there. It would have  
9                   been there all along no matter what.

10                  **DR. MAURO:** All along, it would have been  
11                  there anyway.

12                  **DR. NETON:** So then the question is does  
13                  thorium concentrate at all in the balance at  
14                  Plant 4, Building 40. And I say the Fipper\*  
15                  Reports show that it doesn't seem to if the  
16                  process is the same. But we can ask the  
17                  workers.

18                  **DR. MAURO:** And the reason that becomes  
19                  important because you brought Building 44 into  
20                  the action as a result of the new work. Now  
21                  you can't say, well, it's just part of the  
22                  process.

23                               Now the third place, and I bring this  
24                               up because these are questions that I guess we  
25                               would like answered. The third place is on

1           the very bottom of the chart where you see  
2           right in the middle of the page on the bottom  
3           line the word filter, and it says filtrate to  
4           waste.

5                       This is one of the last steps in the  
6           process where the uranium itself is being  
7           purified so that you get the best quality  
8           yellowcake you possibly can in the end of the  
9           process. So there's some kind of filtration,  
10          re-precipitation step occurring here to try to  
11          get a purified uranium. Now is it possible  
12          that this is the last place where some thorium  
13          may break out?

14               **DR. NETON:** Well, the filtrate to waste, I  
15               assume that this is a liquid waste stream.

16               **DR. MAURO:** That's right, and if that's the  
17               case, we need to know that. Or they may --

18               **DR. NETON:** That just goes to the sewer.

19               **DR. MAURO:** -- or they may dry it, package  
20               it and dispose of it as solid waste. Perhaps  
21               return it to the tailings pile.

22               **DR. NETON:** Yeah, that's a good question.

23               **DR. MAURO:** So those are the three places  
24               where if we could -- I guess there are two  
25               questions here. One, if it stays wet, the

1                   problem goes away. Two, if the quantity of  
2                   thorium is small and the matrix in which it is  
3                   in is relatively large, well, then the  
4                   specific activity of the thorium in that  
5                   little package is not going to be as bad as it  
6                   is in the 55 gallon drum. The problem goes  
7                   away.

8                   **DR. NETON:** One of the issues I think is how  
9                   frequently they changed out those filters  
10                  because it's easy to calculate sort of a  
11                  bounding estimate to how much thorium could be  
12                  in those filters on a worst-case basis. But  
13                  they made one drum a month basically or  
14                  something like that.

15                 **DR. MAURO:** Yeah, it wasn't much.

16                 **MR. TOMES:** I'm just going to come in on  
17                  this last step, on this filtrate to waste, the  
18                  final filter. Blockson had in all their  
19                  documentation the work they had done, they had  
20                  an action of actually, this filtrate was  
21                  identified as going to a sewer. And they  
22                  would sample it. If it was less than 0.5  
23                  grams U per liter, they would dump it to a  
24                  sewer which indicates that they were checking  
25                  to be sure they got all the uranium out of it.

1                   And there also was a step that I  
2                   believe Dr. Elzerman, if I'm interpreting  
3                   correctly, that is probably the most likely  
4                   place the Thorium-230 would be separated from  
5                   the uranium at that step right there. Where  
6                   the Thorium-230 may have formed some complexes  
7                   that did not precipitate out in that step, and  
8                   it could have gotten pumped to the sewer.

9                   **DR. MAURO:** And could have gone --

10                  **MR. ELLIOTT:** And going to the sewer implies  
11                  a wet stream.

12                  **DR. NETON:** Yeah, it would just be dumped  
13                  down a drain.

14                  **DR. ROESSLER:** But going to the sewer  
15                  implies no concern for workers.

16                  **DR. MAURO:** Yeah, I think that's a line on  
17                  putting this to bed by then answering these  
18                  questions.

19                  **DR. NETON:** If this filtrate was sampled and  
20                  had more than -- what was it? Half a --

21                  **MR. TOMES:** Half a gram.

22                  **DR. NETON:** -- half a gram per liter, I  
23                  assume they probably feed it back into the re-  
24                  precipitation process.

25                  **MR. TOMES:** I don't know, but I would assume

1           that they would; however, I don't think it  
2           would be a significant amount because they  
3           would have had additional steps if they were  
4           having significant problems.

5           **MS. MUNN:** It would only be good business to  
6           do so.

7           **DR. NETON:** But it's very, very good to  
8           bring these up. You're right.

9           **DR. WADE:** So the need for the worker  
10          outreach meeting. You also mentioned, Jim,  
11          that you had looked at the literature but  
12          maybe not as rigorously. Is that something  
13          that the work group wants pursued or not?

14          **MS. MUNN:** I think the literature probably  
15          has been pretty well beaten to death by now.  
16          I would suspect both our contractor and our  
17          subcontractor and certainly the agency has --

18          **MR. ELLIOTT:** We presume the subject matter  
19          experts looked at it fairly --

20          **MS. MUNN:** Well, that's theoretically what  
21          they are. Subject experts who already know  
22          what's in the literature. My concern is in  
23          the discussion here, being a novice to this  
24          type of production, it still appears to me  
25          that I'm hearing the same kinds of discussions

1           that I thought I was hearing at the worker  
2           meeting at Blockson.

3                       So there's concern with respect to  
4           whether that source of information has been  
5           adequately mined. I haven't seen it. I  
6           haven't seen the minutes. And there were  
7           several people who spoke specifically to the  
8           types of conditions under which the waste  
9           streams were handled. Not extensively, but  
10          they spoke to them.

11                      I want to make sure that we're not  
12          asking questions that have already been  
13          answered in previous worker meetings. Without  
14          those minutes, and my apologies for not having  
15          requested those earlier --

16                      **MR. TOMES:** I believe there was a couple  
17          brief comments made at the previous worker  
18          meetings concerning waste streams. It was not  
19          the focus of the questions necessarily, but  
20          there was a couple, I know I asked a couple  
21          questions. It was very brief, and the people  
22          did not know the answer to it. So there was  
23          really nothing discussed. But it was clearly  
24          not, we did not focus on those issues. We  
25          were focused on the general process. And I

1 believe it would be beneficial to focus on  
2 these issues at the meeting because we did not  
3 focus on them at all. I mean, it was just it  
4 was a couple comments here and there and  
5 people did not identify that they knew  
6 anything about that. But perhaps if we asked  
7 more specific questions, a couple of the  
8 workers who actually worked in that building  
9 may know.

10 **DR. ROESSLER:** How hard would it be to get  
11 the minutes? It seems like we should have  
12 them.

13 **DR. WADE:** This is the first action item.

14 **DR. ROESSLER:** Pardon?

15 **DR. WADE:** This is the first action item.  
16 It seems that those minutes should be shared  
17 with our work group.

18 **MR. TOMES:** They're on the website.

19 **DR. ROESSLER:** They are on the website?

20 **MR. TOMES:** Uh-huh.

21 **DR. ROESSLER:** Oh, under the Blockson?

22 **MR. TOMES:** Yes.

23 **DR. NETON:** I'd like to get back to what Lew  
24 mentioned about the literature, and maybe  
25 that's a misunderstanding what I meant by a

1 review of the literature. What I was talking  
2 about was not necessarily reviewing the  
3 literature on the radiochemistry of thorium,  
4 but to review the literature on the raffinates  
5 that were produced in the Department of Energy  
6 process to determine, to put a sort of sanity  
7 check on this. What are the upper limits that  
8 one observes when one is not trying to  
9 purposely concentrate thorium?

10 I mean, just as sort of a byproduct of  
11 concentrating uranium, that one can put an  
12 upper cap on what the concentration of  
13 Thorium-230 in these raffinates might have  
14 been. It wouldn't be the end result, but it  
15 would add to this sort of weight of the  
16 evidence argument that John Mauro was talking  
17 about that, yeah, we don't see any place where  
18 it concentrates, intentionally try to  
19 concentrate thorium.

20 Let's look at some similar processes  
21 and see what the raffinates contain as far as  
22 thorium, and indeed, have we not bounded the  
23 amount by dumping it all in the drum and  
24 putting 330 nanocuries per gram into the  
25 workers' breathing zone. I thought that that



1 would just add some extra weight of the  
2 evidence to the argument.

3 **DR. ROESSLER:** Give an example of where they  
4 were doing something where they were not  
5 trying to concentrate uranium at least for my  
6 --

7 **DR. NETON:** Well, the raffinate at Fernald,  
8 the Thorium-230 cold door silos, Silo 3, had  
9 an average concentration of about 60  
10 nanocuries per gram of Thorium-230. That is  
11 some of the highest uranium-bearing ores that  
12 was ever produced, the Belgian Congo ores, and  
13 it came up. I'm not suggesting it was exactly  
14 the same, but I'm saying that this is sort of  
15 what you end up with in a process where you  
16 take tons of ore products and start refining  
17 it.

18 **DR. MAURO:** So I think it's you're saying  
19 you saw 60 nanocuries per gram of Fernald  
20 raffinate and at the Blockson can, it's 80?

21 **DR. NETON:** Three hundred and thirty.

22 **DR. MAURO:** Three hundred and thirty.

23 **DR. NETON:** Assuming you have 100 percent  
24 recovery. Now that may or may not be true,  
25 but if it's 50 you can scale it down by half.

1           If it's a pure uranium product, it would be,  
2           because it was in equilibrium with uranium.  
3           Uranium has about 330 nanocuries per gram. So  
4           you'd have 330 nanocuries of Thorium-230.

5                     That's a fairly high amount, a third  
6           of a microcurie of uranium per gram in the  
7           breathing zone of the workers is quite a bit.  
8           Again, I'm hard pressed to see anywhere in  
9           this process where it might be higher.

10           **DR. MAURO:** I think that's an important  
11           element to this whole argument.

12           **DR. NETON:** I think that it might be. We  
13           won't do a definitive search, but just sort of  
14           a sanity check, an upper bounding look.  
15           Clearly, if we found a bunch of places it's  
16           much higher than that, and I do have to state  
17           with a caveat that they weren't purposely  
18           trying to concentrate Thorium-230. There are  
19           some processes, for example, at Mallinckrodt  
20           where they were trying to make Thorium-230 to  
21           send it to Mound for production purposes.

22           **MR. ELLIOTT:** For the worker outreach  
23           meeting I think from this discussion and from  
24           the reviews that we've had from the subject  
25           matter experts on both sides, I think we are

1           able to formulate good questions. And I think  
2           Jim and Tom can put those things together and  
3           share them with the working group.

4                     And we should carry them to the field  
5           with us for this meeting with these workers  
6           and have them on one page and make sure that  
7           we attend to business there and focus on those  
8           questions when we get to that part in the  
9           presentation.

10           **MS. MUNN:** That I think would be highly  
11           appropriate. And as a matter of fact since we  
12           have a very short agenda here today, and this  
13           topic is the key topic. So far as I know it's  
14           really the only outstanding topic. Am I  
15           correct?

16           **DR. MAURO:** There's one other topic that I  
17           would consider to be a non-SEC issue that we  
18           would benefit from some discussion today even  
19           though it's a non-SEC. And this has to do  
20           with the Type M, Type S discussion we had  
21           before.

22           **MS. MUNN:** Yes.

23           **DR. MAURO:** The reason I say it's a non-SEC  
24           because, you know, for obvious reasons.  
25           Whether or not it would even benefit from some

1 discussion of that today also is certainly up  
2 to the working group.

3 **MS. MUNN:** I think that would be a fine  
4 thing to do. What I'm going to suggest is a  
5 little unusual. So far as I know we haven't  
6 done this in the past, but because we're here,  
7 because we're all clear on what we want to do  
8 but not clear on the specifics of what the  
9 question needs to be, I would like to suggest  
10 that we take about a 45-minute break and have  
11 our NIOSH folks and our SC&A folks sit down  
12 and write out, define for us, what those three  
13 big questions are going to be that we'll ask  
14 of the workers. If we can do that, then we  
15 can get the questions together. We can have a  
16 short break for lunch. We can come back. The  
17 entire group can look at the questions and  
18 agree or disagree, add to or correct, and we  
19 can have a brief discussion on the Type M  
20 issue. Is that satisfactory with everyone  
21 here? Does that make sense?

22 (no response)

23 **MS. MUNN:** It doesn't appear to me that  
24 composing the three questions is feasible in  
25 our entire group and having the people on the

1 phone waiting to see what we're going to come  
2 up with. That discussion probably is not  
3 productive for all of us. But those folks who  
4 are the experts need to be the ones who are  
5 telling us what we need to know to resolve  
6 this. Are you all amenable with that?

7 **DR. ROESSLER:** Uh-huh.

8 **MS. MUNN:** If that's the case, then I would  
9 suggest that the larger group now adjourn  
10 temporarily. That will give you until 12 noon  
11 to put together the questions. Will we need  
12 more than a half hour after that for lunch as  
13 well?

14 **DR. NETON:** It depends on how long it takes  
15 the smaller group to write the questions.

16 **MS. MUNN:** Let's adjourn temporarily. We  
17 will, let's come back here at 12:45. Agreed?

18 **DR. NETON:** Okay.

19 **MS. MUNN:** And those of you who are going to  
20 put the questions together, please do so. For  
21 the folks on the telephone, I think you can  
22 take a break until 12:45.

23 **DR. NETON:** Are we going to break the  
24 connection here?

25 **DR. WADE:** Yeah, we'll break the connection.

1 We'll dial back in at 12:40.

2 (Whereupon, the working group recessed from  
3 11:13 a.m. until 12:45 p.m.)

4 **THREE QUESTIONS FOR WORKERS' MEETING**

5 **MS. MUNN:** Welcome back, let's call  
6 ourselves back into session. I understand  
7 that we had a productive meeting with respect  
8 to pulling together the three questions that  
9 we specifically want to make sure get  
10 addressed during the next workers' meeting.  
11 Who would like to read those questions to us  
12 so that we can have any discussion that might  
13 evolve from that?

14 **MR. TOMES:** I can do that.

15 **MS. MUNN:** Thank you, Tom.

16 **MR. TOMES:** We have three questions with  
17 some details on each question a little bit  
18 here. The first one is what were the steps  
19 involved in the monosodium phosphate  
20 production process which occurred in Building  
21 40 to partially neutralize the phosphoric acid  
22 before they pumped to Building 55? And I've  
23 got a couple other questions I'd like to, you  
24 know, related to that, you know, more focused  
25 responses that we can get from the workers.

1                   For example, what happened to the solids  
2                   filtered out before the liquid was pumped to  
3                   Building 55 as a potential source. And we  
4                   want to know if there was any drying done in  
5                   Building 40 of this filtered out waste.

6                   **MS. MUNN:** My guess is we'll be very  
7                   fortunate if we have workers who can get down  
8                   to that level of specificity, but  
9                   nevertheless, it's worth asking.

10                  **MR. TOMES:** And also if there was filter  
11                  change-out frequency for filtering material in  
12                  Building 40.

13                  And the second question is how was the  
14                  monosodium phosphate processed after it left  
15                  Building 55. So we're wanting to know  
16                  actually what happened, what they did to the  
17                  processed monosodium phosphate before it came  
18                  into Building 55, and what they did with it  
19                  after it left Building 55. Where it went if  
20                  they know that, and again, if it was filtered  
21                  or further processed in their regular plants.

22                  And the third question we're proposing  
23                  to ask is how was the waste from Building 55  
24                  handled. Specifically, the liquid waste that  
25                  was generated from the final step, what was

1           done with that? Was it processed or pumped  
2           out? If they know anything about that  
3           particular waste stream.

4                   And we'd also like to know if they  
5           know any information about how filtrate waste  
6           may have been handled. You know, they  
7           recycled some of the filtrate in the building.  
8           And at some point it's assumed that that would  
9           become not useful to re-use, and they would  
10          have discarded it.

11                   And those were our three questions  
12          right there.

13          **MS. MUNN:** I believe I recall having heard  
14          some of them talk about some of the waste  
15          stream having been pumped outside, but I don't  
16          recall the specifics and haven't re-read, and  
17          shouldn't make that comment really because I  
18          haven't re-read the minutes.

19                   But does anyone have any concern, any  
20          further issue with respect to those three  
21          questions? Do you feel they cover what we're  
22          attempting to get to here?

23          **DR. ROESSLER:** I was looking at the minutes  
24          from that last public outreach while I was  
25          having lunch, and I haven't gotten all the way



1 through them yet, but I think we're going to  
2 have a problem with terminology. I don't see  
3 anything in the minutes that talks about the  
4 monosodium process.

5 I think they used words, they say  
6 liquor, and they have different terminology.  
7 And I think we're going to have to have  
8 somebody translate these questions into  
9 something that the workers will identify with  
10 or we're not going to get answers.

11 **MR. TOMES:** The liquor is common in the  
12 literature, too, referred to as liquor in the  
13 Building 55.

14 **MS. MUNN:** Are you going to be at that  
15 meeting, Tom?

16 **MR. TOMES:** Yes, ma'am.

17 **MS. MUNN:** And John?

18 **DR. MAURO:** I was not planning to. It would  
19 be Bill or Chick Phillips. They know a lot  
20 more about it than I do.

21 **MS. MUNN:** Okay, so then either Bill or  
22 Chick will be there.

23 **DR. MAURO:** Yes.

24 **MS. MUNN:** Will you folks be able to make  
25 that cross-connection between terminology?

1           **MR. THURBER:** I think if one showed them  
2           this diagram and said we're talking about this  
3           box here that's called the Blockson monosodium  
4           phosphate process. We're talking about this  
5           waste stream which says, whatever it says,  
6           return process.

7           **MS. MUNN:** Yeah, I was going to say we need  
8           a better copy.

9           **MR. THURBER:** I didn't have my glasses on;  
10          that's all. And we're talking about primarily  
11          this waste stream here, you know. Tell us  
12          what you know about those. I think that would  
13          probably capture it, and capture it in a way  
14          that they would be able to understand  
15          precisely where we were going.

16                 Jim?

17          **DR. NETON:** I agree. I think it's a good  
18          idea to have this diagram because this is a  
19          1958 vintage diagram that presumably some of  
20          the workers might recognize.

21          **DR. ROESSLER:** You think there'd be also a  
22          connection between the diagram and locations  
23          in the building that would help them focus in  
24          on what the questions are?

25          **DR. NETON:** My recollection, Building 55 is

1                   pretty small.

2                   **MS. MUNN:** Yeah, it's not --

3                   **DR. NETON:** It's a hundred by two hundred.

4                   **MS. MUNN:** It's not a big building.

5                   **DR. NETON:** So we just need to differentiate  
6 between what was in Building 55 and then the  
7 balance of the phosphate processing area which  
8 I think is Building 40.

9                   **MS. MUNN:** Yeah, 40.

10                  **DR. NETON:** Forty. So I think we could make  
11 that distinction for one of them. It's a good  
12 plan. I think we need to make sure we have  
13 this available to display.

14                  **DR. MELIUS:** We should have this blown up so  
15 we can use it as a display thing or something.

16                  **DR. NETON:** Yeah, we'll have a PowerPoint --

17                  **DR. MELIUS:** Just talk about it, I mean  
18 otherwise it's going to be --

19                  **DR. NETON:** Agreed.

20                  **DR. MELIUS:** -- difficult to --

21                  **DR. NETON:** Usually we have a PowerPoint  
22 presentation at these worker outreach  
23 meetings, and we'll make sure that when this  
24 is blown up, it can be read.

25                  **MS. MUNN:** Gen, this is what the building

1 looked like.

2 **DR. ROESSLER:** Yeah, I saw, but even so --

3 **MS. MUNN:** Yeah, it really wasn't a large  
4 and complex building.

5 But if it's possible for us to have  
6 those questions in written form and a hard  
7 copy of the process that's available for the  
8 people preferably prior to the meeting or at  
9 least first thing early in the meeting so they  
10 have a chance to look at it.

11 **DR. MAURO:** Any possibility that prior to  
12 the meeting whoever the counterpart is who  
13 represents the workers, a discussion could be  
14 held about what we're trying to accomplish.  
15 Maybe they could help us craft the questions  
16 in a way that might be more -- I don't know if  
17 we have that kind of relationship.

18 **DR. NETON:** Yeah, I don't know, John. I'm  
19 not sure that we do have a contact at Blockson  
20 like we have at other plants. We'll check  
21 into that though. If we do, it's certainly a  
22 good idea.

23 **DR. MELIUS:** There's an international union  
24 contact who happens to be in Cincinnati. I  
25 think he's on vacation this week. But he's

1           been in touch with Vern McDougall\*. It's John  
2           Morowitz\*. He used to work at NIOSH. They've  
3           gotten involved recently. So I talked to him  
4           a few months ago. He called me up about the  
5           process and our process. How we handle things  
6           and what was going on there. So John may be  
7           able to track down, help you track down ahead  
8           of time who would be a good contact and so  
9           forth. And I thought when we were in that  
10          meeting, I thought there were some of the  
11          former union --

12          **MS. MUNN:** Mark Lewis might know those kinds  
13          of people.

14          **DR. ROESSLER:** Well, in the minutes that I  
15          was just looking at one of the key players was  
16          Mark Lewis. He said he was formerly with the  
17          union. The union was then disbanded. But it  
18          occurred to me, I haven't read through all the  
19          minutes, but he was sort of organizing the  
20          people there.

21          **DR. MELIUS:** It's a different union though.  
22          This, the International Chemical Workers, I  
23          think, represented Blockson.

24          **DR. ROESSLER:** But he seemed to be the one  
25          who was organizing the workers and --

1           **DR. MELIUS:** Yeah, he did. I don't know  
2 about his, Mark's, continued involvement  
3 because I don't think -- is he still involved?  
4 I don't think so. Vern McDougall's the, NIOSH  
5 has redone their outreach component, and Vern  
6 McDougall, who had worked with Mark on this  
7 before, but Vern is now doing it. And Vern  
8 was the one that had reached out to John  
9 Morowitz.

10          **DR. NETON:** Right.

11          **MR. TOMES:** He had told me he had gotten  
12 contacts with the union.

13          **DR. MELIUS:** Okay, but Morowitz is right  
14 here in Cincinnati.

15          **DR. NETON:** We'll work through that and see  
16 what we can do with that; it's a good idea.  
17 We just need to see if we can accomplish this  
18 in the few weeks we have before the September  
19 12<sup>th</sup> meeting.

20          **DR. MELIUS:** At the time I talked to him I  
21 don't know if he's on Laurie's contact list or  
22 not.

23          **MS. MUNN:** So, Jim, you can identify,  
24 attempt to identify that contact and see if we  
25 can get those two items in their hands, the

1 picture of the flowchart and the three  
2 specific questions?

3 **MR. GIBSON (by Telephone):** I want to just  
4 go on record here that kind of this is a  
5 different perspective but as far as the  
6 chairing the worker outreach working group,  
7 I'll be attending the meeting just to see how  
8 these meetings go, but I don't really recall  
9 having these outreach meetings to where  
10 workers are somewhat compelled or limited in  
11 their responses or in their input.

12 **MS. MUNN:** They won't be here either.

13 **MR. GIBSON (by Telephone):** I understand  
14 we're asking them for any specific information  
15 they may have, but I would have a concern if  
16 it's limited to that.

17 **MS. MUNN:** No, there is no intent to limit  
18 it. Au contraire, but the earlier, the two  
19 earlier meetings at Blockson were really wide  
20 open and very informative. People talked  
21 about whatever they wanted to talk about and  
22 that will continue to be the case I'm sure.  
23 It's just that without specific issues to be  
24 addressed, it's difficult for people  
25 themselves to focus in what is now a major

1 issue. This is an attempt to make sure that  
2 in the process of their telling their stories,  
3 hopefully, someone has some answers to these  
4 questions, too.

5 **MR. GIBSON (by Telephone):** Specific but not  
6 limited to.

7 **MS. MUNN:** Correct.

8 **DR. NETON:** The focus of this meeting was  
9 originally going to be to discuss the revision  
10 to the site profile which we took a lot of  
11 their comments and incorporated and made  
12 significant revisions to the profile and so  
13 sort of roll that out for them and get  
14 feedback on the general content of the site  
15 profile. But like Wanda said, while we're  
16 there it certainly behooves us to at least try  
17 to focus on these issues that will help us  
18 resolve the SEC part of it.

19 **MS. MUNN:** When we held the earlier  
20 meetings, I don't think we really knew exactly  
21 what we wanted to know. We just wanted as  
22 much information as we could get. And we  
23 still want as much information as we can get,  
24 but we specifically want answers to these  
25 questions because that's what's keeping this



1 work group from coming to a conclusion. And  
2 we do want to get this off the table as early  
3 as possible.

4 **DR. ROESSLER:** Speaking of getting it off  
5 the table, what do you see would be the  
6 sequence of events after the outreach meeting?  
7 Will we need to have a work group come back  
8 together again to then finally resolve what  
9 still seems to be a question?

10 **MS. MUNN:** It would be my hope that we could  
11 do that possibly at the October meeting. I'm  
12 not certain. A part of it depends on how much  
13 shakes out of the worker meetings. It also  
14 depends on what that timeframe is for other  
15 people for other items on our agenda. We have  
16 a pretty heavy agenda in October.

17 **DR. WADE:** So when you're going to be able  
18 to review the minutes of that meeting. The  
19 meeting's on September 12<sup>th</sup>. When would you  
20 normally expect to have the minutes available,  
21 the transcript available?

22 **DR. NETON:** I don't think it's going to be a  
23 transcript. I think it will be minutes. We  
24 should have that available for our own use  
25 within a week or so after that. There may be

1           some time delay for the redacted version to  
2           appear, but we could use it internally. I  
3           would think that we should be able -- and I  
4           want to speak to Tom because he's the one, the  
5           technical lead on this -- put together a white  
6           paper or a position paper outlining much of  
7           what we discussed earlier and incorporating  
8           what we learn at the meeting and just outline  
9           our position, where we are at that point. And  
10          then provide it to the working group for  
11          further discussion. That should be able to  
12          happen I would think towards the mid to end of  
13          September. Well, probably the end of  
14          September if the working group meeting's on  
15          the 12<sup>th</sup>.

16               **DR. WADE:** And the Board is meeting on  
17          October 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> in Blockson country.

18               **MS. MUNN:** In Blockson country, yes.

19               **DR. NETON:** It sounds late to have that  
20          produced, but I do think this is one of the  
21          only issues that we have on the table. And I  
22          don't envision this report being more than  
23          under ten pages probably. I mean, it's just  
24          going to outline sort of the weight of the  
25          evidence we have on where we believe this

1           thorium may or may not have concentrated. How  
2           firmly we can state that.

3           **MS. MUNN:** As I see it this is the single  
4           outstanding item which this group needs to  
5           make a recommendation to the full Board.

6           **DR. NETON:** I believe that's true.

7           **MS. MUNN:** And if we can, in fact, do that  
8           prior to the October meeting, it would be most  
9           helpful for everyone if we can -- think we can  
10          do that, Tom?

11          **MR. TOMES:** Okay.

12          **DR. MELIUS:** That may be, but I will go on  
13          record that I would be opposed to any final  
14          action on this unless we've given adequate  
15          time for the petitioners to review the  
16          information and have it accessible to them.  
17          And frankly, the track record of getting  
18          things through Privacy Act review and so forth  
19          has not been good. So I really think we're,  
20          it would be a mistake to try to think that we  
21          can complete this at the October meeting.

22                 Again, it may depend on what the  
23          findings are or something like that. I mean,  
24          whatever, probably can't be by September 12<sup>th</sup>,  
25          but to me I don't see where that's going to

1 work out. And I think we have to be, have a  
2 process that's fair, open and transparent.  
3 And we've not been doing that recently with a  
4 number of these sites, and I think enough is  
5 enough and let's be realistic about what we  
6 can accomplish within the timeframe.

7 **MS. MUNN:** What can you recommend, Jim?  
8 What would your recommendation be?

9 **DR. MELIUS:** Well, my recommendation is I  
10 think we're going to end up doing another work  
11 group meeting, and maybe that can be done at  
12 the October meeting in conjunction with that.  
13 But I don't think we're going to be ready, and  
14 we'll have fully shared all the information in  
15 time for a decision by the Board at the  
16 October meeting.

17 **MS. MUNN:** Well, I'm not suggesting  
18 necessarily a decision by the Board. I just  
19 want to be able to lay before the Board any  
20 very thorough list of outstanding items that  
21 we have. And in my mind I see this one as  
22 being the current issue, and a single current  
23 issue. If you have a recommendation for how  
24 to proceed, we're open to hear it.

25 **DR. MELIUS:** I'm fine with what you just

1           said. We should update the Board, and we do  
2           it at every meeting, but --

3           **MS. MUNN:** Well, I'm concerned about your  
4           concern relative to adequate notification of  
5           the SEC and worker groups. How would you like  
6           us to proceed in that regard?

7           **DR. MELIUS:** I don't think that's going to  
8           be possible to do in time to resolve this  
9           issue by the Board, a final conclusion  
10          presented to the Board at the October meeting.

11          **MS. MUNN:** So I'm asking for your proposal.  
12          What then do you propose?

13          **DR. MELIUS:** That it not be done until a  
14          meeting after the October meeting.

15          **DR. WADE:** Well, I think we would serve the  
16          public well if at the October meeting we could  
17          daylight everything that we have. Let them  
18          know what the issues are, what the work group  
19          has done, what's available. Make sure that  
20          all of that is before the public to the degree  
21          it can put before the public with the  
22          expectation being that the Board will need to  
23          chew on that awhile. And also, there might be  
24          time for the petitioners and others to react  
25          to that with the vote likely coming at the

1 January meeting.

2 MS. MUNN: Is it possible that we could do  
3 that, take care of the final vote during our  
4 December call? We have a December call  
5 scheduled. Is there any problem with doing it  
6 at that time?

7 DR. WADE: It's possible. I think when the  
8 Board is going to vote on an SEC petition that  
9 has history and issues, I think sometimes it's  
10 best to do that when the Board is face-to-face  
11 and can really thrash through things, and so I  
12 would, from my perspective, if it's the  
13 difference between December and January, I'd  
14 rather see it face-to-face in January.

15 MS. MUNN: Jim?

16 DR. MELIUS: January in Chicago sounds  
17 wonderful.

18 MS. MUNN: That's, we're going to Chicago  
19 but not repeatedly, I hope. There are a  
20 couple of hundred other sites that we need to  
21 be concerned with.

22 DR. WADE: Well, if you think about facing  
23 the people at Blockson in October with a  
24 complete discussion and disclosure of issues,  
25 and where we stand, and documents that are or

1 soon will be available, I think we serve what  
2 Jim is telling us what we need to serve. And  
3 that is the interests of the petitioners and  
4 claimants. Give them an opportunity to hear  
5 and to comment there or subsequent to that  
6 with an expectation with a Board vote in  
7 January. I think that's doing the public's  
8 business well it seems to me.

9 **MS. MUNN:** Agreed?

10 (no audible responses)

11 **MS. MUNN:** I'm seeing a nod of the head. I  
12 don't know whether it's to me or not, but I  
13 see a nod of the head.

14 **DR. WADE:** And Jim also makes -- a lesson we  
15 need to learn, it's like my mother always used  
16 to say, your eyes are bigger than your  
17 stomach. We take on more than we're able to  
18 do, and if this meeting is going to happen on  
19 September 12<sup>th</sup>, having a redacted version  
20 before the petitioners in time is going to be  
21 tough. And that's just life. I mean, we can  
22 try, but we've tried and failed before. And I  
23 think we need to learn from our past failures.

24 **MS. MUNN:** So we will make as much of a  
25 presentation as is possible without the actual

1 redacted --

2 DR. WADE: I would love to have the redacted  
3 version available when you meet in October,  
4 but I'm not going to bet the farm on it. I  
5 think we should push for it.

6 DR. NETON: I still think it would be good  
7 if we could get our position paper formulated  
8 by the end of September.

9 MS. MUNN: It would be very nice.

10 DR. NETON: Because then it could be taken  
11 up for discussion as a working group whenever  
12 you felt like it. But I agree with Jim. The  
13 redacted version is important to have.

14 DR. WADE: The work group can meet an hour  
15 before one evening. They could do it on the  
16 phone before. I mean, there are options  
17 available to you for that to have an intimate  
18 discussion of the work group. We could  
19 schedule this the third day or the second day  
20 and meet the evening of the first day. There  
21 are all kinds of options to that, but we're  
22 not going to have our business done with  
23 everything wrapped up on October 5<sup>th</sup>.

24 DR. ROESSLER: I think I missed something.  
25 Where are we meeting in October?



1 DR. WADE: Chicago.

2 MS. MUNN: Naperville.

3 DR. ROESSLER: I don't know how I missed  
4 that.

5 DR. NETON: Are we going to Naperville  
6 though?

7 MS. MUNN: Yes, we're going to Naperville at  
8 the request of the work groups and the  
9 senators.

10 DR. MELIUS: Where in Chicago?

11 MS. MUNN: Naperville.

12 DR. WADE: I think the same hotel, I think.

13 I think that's a very reasonable plan  
14 of attack.

15 MS. MUNN: We have an understanding where we  
16 are, right? Then my notes tell me I have only  
17 one other item. John asked to discuss the  
18 solubility issues.

19 **REVIEW OF ACTION ITEMS**

20 DR. WADE: Should we review the action items  
21 now on this?

22 MS. MUNN: Please do.

23 DR. WADE: First is that NIOSH is going to  
24 undertake a literature search surrounding the  
25 issue of the concentration of Thorium-230 in

1 raffinate streams around the complex to get a  
2 sense of, you know, what a plausible upper  
3 bound might be and whether what we're  
4 proposing, what NIOSH is proposing, makes  
5 sense relative to that data background. And  
6 again, obviously, as soon as that can be done  
7 and shared with the work group the better.

8 NIOSH is going to check on a Blockson  
9 contact to help make the wording of the  
10 questions understandable that you bring before  
11 the outreach meeting. And John Morowitz is a  
12 potential point of contact for that.

13 And then we have the outreach meeting  
14 itself that will take place on September 12<sup>th</sup>,  
15 where with no limits to other options, as Mike  
16 Gibson mentioned, there will be a focused  
17 request based upon the questions that have  
18 been prepared. And I think it would be well  
19 to share those questions with the work group  
20 in writing before the meeting just so  
21 everybody has them.

22 By my counting noses Mike Gibson's  
23 going to be at the outreach meeting  
24 representing the work group.

25 **MR. GIBSON (by Telephone):** Gen, will you be

1 at the meeting?

2 **DR. WADE:** Gen will be at the meeting. SC&A  
3 will be represented, and NIOSH will be  
4 represented. And we'll move to share the  
5 minutes of that meeting, un-redacted, to the  
6 work group as quickly as possible and get them  
7 redacted as quickly as possible. The  
8 possibility of a work group meeting sometime  
9 before or during the October Board meeting,  
10 but I'll put on the agenda for the October  
11 meeting a full vetting of technical issues  
12 surrounding Blockson.

13 And I'll do it at a time before the  
14 last public comment period so that people  
15 could make public comment on what we've said  
16 and what we're proposing on Blockson during  
17 that meeting. And the most likely scenario is  
18 voting on Blockson in January at a location to  
19 be determined.

20 **MS. MUNN:** My request would be that we  
21 schedule our working group meeting at the  
22 October session for Wednesday evening,  
23 immediately after the first day. Tuesday is  
24 going to be well taken up with procedures and  
25 subcommittee.

1           **DR. WADE:** So Wednesday is the first day --

2           **MS. MUNN:** Wednesday is the first day of the  
3 meeting.

4           **DR. WADE:** So usually we'll have a public  
5 comment period right after the meeting. So  
6 after that public comment period, 15 minutes  
7 rest break, and then the work group meets.

8           **MS. MUNN:** And then the work group meets for  
9 hopefully no more than an hour.

10          **DR. MELIUS:** How about breakfast the next  
11 morning? I'm probably not going to be there  
12 Wednesday. I'm sorry. I have another NIOSH  
13 engagement that day, and I don't know by the  
14 time I fly out to Chicago that evening, I'll  
15 make it in time.

16          **MS. MUNN:** I will expect you to be chipper.

17          **DR. MELIUS:** In the morning I will --

18          **MS. MUNN:** And you gain an hour.

19          **DR. MELIUS:** The last time I flew to Chicago  
20 I was delayed. I had to give Dr. Howard a  
21 ride.

22          **MS. MUNN:** So you would prefer Thursday  
23 breakfast.

24          **DR. WADE:** Thursday for breakfast. I'll set  
25 the starting time of the meeting accordingly.

1           **MS. MUNN:** Good, that would be much  
2 appreciated.

3           **DR. ROESSLER:** How about eight?

4           **MS. MUNN:** That's not bad.

5           **DR. WADE:** Eight for breakfast. Nine-  
6 fifteen the Board meeting, eight o'clock  
7 breakfast.

8           **DR. ROESSLER:** The way you work us around,  
9 Wanda, we can finish in an hour.

10          **MS. MUNN:** That just depends on what comes  
11 back from the group in Blockson. All right, I  
12 think we know what we're doing. Fairly sure.

13          **DR. NETON:** One thing Lew that you may have  
14 left off which maybe you did intentionally was  
15 to have this position paper out possibly by  
16 the end of September, the position paper on  
17 the raffinate issue. We were going to try to  
18 have that out before the October Board  
19 meeting.

20          **DR. MELIUS:** Twenty-four hours later SC&A  
21 will have their --

22          **DR. NETON:** That's true, SC&A does need time  
23 to -- we'll try to get it out as soon as  
24 possible.

25          **DR. MELIUS:** I think to be fair to everybody

1           it's just I'd rather have everybody do a good  
2           job and not try to meet an artificial --

3           **DR. NETON:** Agreed.

4           **DR. MELIUS:** -- deadline.

5           **MS. MUNN:** Well, in view of the fact that we  
6           have a significant amount of time following  
7           the October meeting before we are going to  
8           make the decision, there should be adequate  
9           time for an additional paper back if that's  
10          necessary from SC&A. And if we're going to  
11          require an additional exchange of some sort in  
12          this work group, we can always convene a  
13          telephone meeting if that's going to be  
14          necessary so that we can be well prepared for  
15          the December phone call as a final wrap up and  
16          final presentation in January to the full  
17          Board. Agreed?

18                 (no audible response)

19          **SOLUBILITY ISSUES**

20          **MS. MUNN:** Final topic, John?

21          **DR. MAURO:** The only other non -- I won't  
22          call it that, but the other issue that would  
23          appear to us as being a non-SEC issue has to  
24          do what are the, in the latest version of the  
25          site profile, the approach that's been adopted

1 by NIOSH for doing dose reconstruction is to  
2 assume that the workers that are handling the  
3 uranium in the 55 gallon drum, the nature of  
4 the airborne uranium oxide, the yellowcake, is  
5 Type M.

6 And in the report reference is made in  
7 the report, the site profile report, the  
8 latest version, reference is made to some  
9 citations that established the basis for  
10 assuming that it's appropriate to assume that  
11 this is absorption Type M. We're not  
12 disputing that it is or is not Type M. But  
13 when we looked into the literature behind it,  
14 it was equivocal. That is we really, we're  
15 not, it did not make a case that, in fact, it  
16 is Type M.

17 And the reason we consider that to be  
18 important is depending on the cancer type as  
19 we all know, depending on whether you assume  
20 it's Type M or Type S could make a big  
21 difference in the dose reconstruction. So on  
22 that basis we raised the question that it  
23 appears that a little bit more evidence for  
24 why Type M is, in fact, the appropriate  
25 assumption in this particular case. Because

1 as you may know, in other places, AWE sites,  
2 when we were in this situation working with  
3 yellowcake or an oxide of uranium, the way in  
4 which the protocol followed was the dose  
5 reconstructor was instructed to assume the  
6 worst type, whether it's S or M, depending on  
7 the organ of concern.

8 In this particular exposure matrix the  
9 instructions are to use Type M only. And we  
10 raise the question based on looking at the  
11 literature behind it, it doesn't appear that  
12 the evidence is overwhelming that that's, in  
13 fact, the case. And I guess that's as far as  
14 we've interpreted it.

15 **MR. TOMES:** The one reference that it is  
16 incorrect. The DOE standard, it's changed  
17 since the last, you know, and I looked up the  
18 comments, and in fact, the new version does  
19 call it Y instead of W in their terminology.  
20 But that was not really the foundation and  
21 basis for why we think it's M.

22 I've got three references just to try  
23 to get a handle on the compound that's  
24 actually produced. I've got my first one here  
25 is a Fernald document because Fernald was



1           actually in the later years of their, of  
2           Blockson's operation was actually receiving  
3           materials. And I got a document from them  
4           that called this a uranile phosphate.

5                       And I also have some documentation  
6           from the research chemist at Blockson who  
7           wrote the publications that we, that you and I  
8           both reviewed. They indicate the cause is  
9           sodium diuranate. And I also have some  
10          documentation from one of the AE officials who  
11          was actually present and assisting Blockson.  
12          They called it a sodium uranile phosphate  
13          chemical.

14                      So there seems -- and it was a  
15          phosphate factory so there was some type of  
16          phosphate, uranium phosphate compound being  
17          produced there. And there's no indication  
18          that there was any of the, highly insoluble  
19          uranium compounds present in that material  
20          such as U-02, high-fired material, just  
21          yellowcake which is a general term applied to  
22          all those types of materials. It's a general  
23          terminology.

24                      And the term U-308 was just used in  
25          the TBD because that is what the DOE required

1 the mass to be reported as, U-308, regardless  
2 of what the compound was. And so we do have  
3 one option in the TBD for Type S material, and  
4 that is in the, we have actually two options  
5 for internal dose in the TBD that use the one  
6 that's most bounding because we have an option  
7 there in Building 55 workers.

8 In our review of other literature and  
9 some of the data from Blockson outside of  
10 Building 55, we wanted to be sure that we were  
11 not underestimating those workers who may not  
12 have been in Building 55. And so we have a  
13 default intake for calcining operations.

14 It was assumed to be the highest, and  
15 that is obviously some higher-fired material.  
16 And it's unprocessed, but before it's been  
17 oxidized and everything. So we're assuming  
18 that either one could have happened on that  
19 stuff. So there's a Type S or a Type M, and  
20 you simply just choose the option for a worker  
21 who would give you maximum dose.

22 **DR. MAURO:** So let me see if I understand  
23 it. So you're saying in that portion of the  
24 operation where you're working with the  
25 uranium ore that has undergone calcining,

1           which could create an oxide of uranium which  
2           is Type S, the dose reconstructor would at  
3           that point use the limiting chemical form?

4           **MR. TOMES:** That's right.

5           **DR. MAURO:** However, in that portion of the  
6           operation in Building 55 where they were  
7           working with the uranium oxide of some form,  
8           whatever the form it was which sounds like it  
9           wasn't necessarily the U-308 that we all know  
10          and love, but it had its own chemistry.  
11          There's lots of evidence that that, in fact,  
12          was Type M. I guess the only suggestion I  
13          would have is that the site profile would do  
14          well to tell that story.

15          **MR. TOMES:** It's better to be more specific.

16          **DR. MAURO:** Yeah, otherwise, yeah, that was  
17          our only concern because we didn't see that  
18          with the story you just told in the site  
19          profile.

20          **DR. NETON:** Tom did a good job. The whole  
21          history of yellowcake is all kinds of  
22          misnomers go around the DOE complex on what  
23          really constitutes yellowcake. Yellowcake  
24          could be any of ten different chemical forms  
25          even among themselves. And U-308 compounds we

1 just learned the new ICRP document on  
2 interpretation of bioassay data has reversed  
3 their opinion and is now calling U-308, M.  
4 Yeah, it's going back to M. It's not released  
5 yet. It's not official. We have a draft copy  
6 of it. They're going back to M. And you  
7 correctly pointed out that it's related to  
8 temperature formation and this particular  
9 material, even if it were U-308, was not  
10 created at a high temperature. When they say  
11 high fired, they mean like in a blast furnace,  
12 in a bomb, not an atomic bomb, but those bombs  
13 where they actually made the uranium in the  
14 compounds. This was just dried overnight.

15 **DR. MAURO:** Yeah, once you move out of the  
16 calcining then you hit it and the chemistry  
17 starts, that's behind you now. So the fact  
18 that the original ore may have been calcined  
19 and had the effect of creating a Type S, then  
20 but once you go into chemistry you're saying,  
21 and you're moving through the monosodium  
22 phosphate, the precipitation, then the  
23 calcining really doesn't have a role anymore.  
24 I mean, you've left that realm. And the  
25 chemical form that's coming out now in this

1 process, you're saying there's evidence that  
2 that's, that stuff is, in fact, Type M.

3 DR. NETON: Yes.

4 DR. MAURO: As I said, I believe that, just  
5 that your citations don't go toward that.

6 DR. NETON: Good point.

7 Interestingly the (unintelligible) out  
8 of Wes Bolch's group at the University of  
9 Florida actually did some solubility  
10 characterizations very recently. It just came  
11 out in Aerosol Science and Technology, 2006,  
12 and they even felt that the raw materials  
13 themselves were actually more like Type M for  
14 the uranium compound. They did some pretty  
15 interesting in situ in vitro solubility  
16 studies, and it was almost M, a little bit S-  
17 looking, but it was almost more characteristic  
18 of resembling a Type M material. It's a very  
19 interesting piece of work.

20 DR. ROESSLER: What was that in?

21 DR. NETON: Aerosol Science and Technology,  
22 2006, "Characterization of Radioactive Aerosol  
23 in Florida Phosphate Processing Facilities".  
24 So they sampled the various processing  
25 applications in phosphates, and they didn't

1 see any evidence of S. And this is the raw  
2 rock. This is not the fluffy, flocculent  
3 material that came out of the --

4 **DR. MAURO:** But before calcining.

5 **DR. NETON:** No, this is after calcining.  
6 But the only thing that was slightly different  
7 in Blockson was Tom mentioned they increased  
8 their calcining temperature to make sure that  
9 the organic materials were fully oxidized  
10 because that would hinder the chemical  
11 recovery of uranium.

12 **DR. MAURO:** Now as far as this issue now I  
13 realize that this meeting, I guess, is mainly  
14 concerned with the SEC aspects of this  
15 question. The degree to which we could put  
16 this issue to bed by let's say providing this  
17 material or whatever is necessary on the O  
18 drive, we can take a look at, that would go  
19 toward more what I would call the site profile  
20 aspect of it, and we can take a look at that  
21 and act on that also if that's what the Board  
22 or work group would like us to do beside  
23 review the white paper or do you want to keep  
24 this separate?

25 **MS. MUNN:** There's no reason to keep it

1           separate. These are all issues that have to  
2           be resolved at one point or another. And if  
3           this can be resolved in any truly  
4           comprehensive way so that we can wrap this  
5           issue up with a ribbon and not have it arise  
6           again at a later time, it would be beneficial  
7           to do so. What the best route for doing that  
8           is, is questionable to me.

9                     I'm not certain whether it's  
10           appropriate to provide a page update for the  
11           site profile or whether it's an issue to be  
12           negotiated in the NIOSH/SC&A realm. My  
13           instinct would be to include it in the  
14           permanent record which would mean ostensibly  
15           an update to the site profile. But if that is  
16           too far outside of our normal process, what  
17           does that involve?

18           **DR. NETON:** Well, typically with the site  
19           profile issues we have sort of a give and take  
20           going back and forth on the issue. I would  
21           prefer that we would do it prior to closing  
22           out, revising the site profile. I mean, this  
23           is very much the way we worked Blockson  
24           Chemical, I mean, Bethlehem Steel. We took  
25           all the issues, and we sort of hashed them out

1 among ourselves and came to a consensus  
2 opinion on all of them, and then we revise it.

3 **MS. MUNN:** Can Tom give us a white paper of  
4 response to inquiry to SC&A? Something in  
5 writing that we can place in the record.

6 **DR. NETON:** I think he could. The only  
7 caveat is that I think that the thorium issue  
8 takes top priority.

9 **MS. MUNN:** Oh, I agree.

10 **DR. NETON:** We'll get that done, and this  
11 would be a second tier issue.

12 **MS. MUNN:** Second tier thing.

13 **DR. NETON:** And if it can all be  
14 accomplished at the same time, that's well and  
15 good, but right now we will commit to having  
16 this Thorium-230 issue summarized and then as  
17 soon as we can get to the solubility we will.  
18 And it may be at the same time, but I can't, I  
19 don't know that we can guarantee that.

20 **MS. MUNN:** It would not seem that it would  
21 be an extensive effort to just put together a  
22 couple of paragraphs and the citations.

23 **DR. NETON:** Well, we like to do it right  
24 because we know the scrutiny under which this  
25 thing would be evaluated.



1           **MS. MUNN:** And you're correct. So we'll do  
2 that if we can at the same time. If we can't,  
3 as soon after there as possible.

4           Are there any other questions, issues?

5           **DR. MELIUS:** Yeah, I have one question,  
6 initially, for John Mauro.

7           It wasn't clear to me in reading your  
8 original review which goes back to January,  
9 you may not remember it, and then your  
10 subsequent to a more focused review, to what  
11 extent you looked at the issue of how robust  
12 the dataset was for the uranium.

13          **DR. MAURO:** You know, I would have to go  
14 back. My recollection is that we hadn't set  
15 an issue. The degree to which we accepted on  
16 face value the measurements, you're correct.  
17 I'd have to go take a look and see how far did  
18 we go.

19          **DR. MELIUS:** In your report you looked at  
20 it, but then actually got into the issue of  
21 the solubility and so forth. It sort of  
22 hinges -- and comment on that, and you didn't  
23 really comment that I could find. I just  
24 looked again on that issue. I think, NIOSH,  
25 you commented on that. I mean, you pulled up

1           their individual records and looked at that  
2           and so forth. You don't need to do anything  
3           now. I mean, I don't want to hold up, but I  
4           would just like to --

5           **DR. NETON:** My recollection is those where  
6           EML HASL measurements which were vetted before  
7           the chemical processing.

8           **DR. MAURO:** I think I remember now. There  
9           was a certain, like a 121 measurements. We  
10          only found -- I might be crossing wires, but I  
11          think we only saw 60-something of the  
12          measurements. In other words we didn't see  
13          them all at the time we did our review. And  
14          we looked at the individual measurements and  
15          saw the range of values and what was done.

16                 And then we looked at your report  
17          where you had more values. But the range that  
18          we found in the data captured the same range.  
19          Then subsequently you folks did provide us  
20          with a full set, and we did look at the full  
21          set. So I think that -- it's coming back --  
22          we did take a pretty good look at that.

23           **DR. MELIUS:** And then my subsidiary question  
24          would be given the expansion of the area  
25          covered by the review, does that change your

1 view of the, you know, I was going to say how  
2 robust that dataset is in terms of  
3 characterizing exposures. Because that I  
4 don't think you commented on. While, again,  
5 it may be fine, I just wanted to raise the  
6 issue now rather than later.

7 **DR. MAURO:** So in other words in light of  
8 the new scope, 40 years is captured, does that  
9 change the inflection of all this?

10 **DR. MELIUS:** Right.

11 **MS. MUNN:** John, can you respond to that?

12 **DR. MELIUS:** If you commented on it before,  
13 I mean, 110 dose reconstructions have been  
14 done, most of those for people outside the  
15 scope of the SEC.

16 **DR. NETON:** Right, but we did take, to use a  
17 word, surrogate data at that point, and we  
18 took the highest 50 milligram per cubic meter  
19 dust loading from the calcining operation, and  
20 --

21 **DR. MAURO:** That's something that we don't  
22 have to wait on. In other words we can go  
23 back, this is not like we're waiting on this  
24 new information from you folks. We can go  
25 back and look at it from that perspective now.

1                   **DR. MELIUS:** I didn't see closure on that.

2                   **DR. WADE:** So, John, you'll provide to the  
3 working group, you'll extract from your report  
4 the pertinent issue and provide it as quickly  
5 as possible.

6                   **DR. MAURO:** And as I understand it is look  
7 at the dataset of the uranium bioassay dataset  
8 from this new context where there'll be 40  
9 years involved the workers in Building 40.

10                  **DR. NETON:** That's true, but we didn't use  
11 the uranium bioassay set to reconstruct doses  
12 in Building 40. We went out and obtained  
13 Fipper\*-type data and took the highest air  
14 concentrations we could find. I think you  
15 reviewed it actually.

16                  **DR. MAURO:** I know.

17                  **DR. NETON:** I mean, the bioassay in Building  
18 55 is separate.

19                  **DR. MELIUS:** My question is mostly for John.  
20 And since I couldn't see a record of what they  
21 reviewed, I didn't see closure on in our two  
22 reports on those two issues and didn't  
23 understand exactly what they did, the  
24 documentation, only see part of the dataset,  
25 not that they had done the whole thing. And I

1           just --

2           **DR. MAURO:** I will go back, read that  
3           section of the report. My guess is I may very  
4           well give you a call to make sure I understand  
5           the scope of your concern and then I will look  
6           at it within that perspective. So I might get  
7           back to you on that.

8           **MS. MUNN:** Anything else?

9           (no response)

10          **MS. MUNN:** If not, we are adjourned until  
11          8:00 a.m., October the 4<sup>th</sup>, in Naperville.

12          (Whereupon, the working group adjourned at  
13          1:35 p.m.)

1

**CERTIFICATE OF COURT REPORTER****STATE OF GEORGIA****COUNTY OF FULTON**

I, Steven Ray Green, Certified Merit Court Reporter, do hereby certify that I reported the above and foregoing on the day of August 28, 2007; and it is a true and accurate transcript of the testimony captioned herein.

I further certify that I am neither kin nor counsel to any of the parties herein, nor have any interest in the cause named herein.

WITNESS my hand and official seal this the 6th day of October, 2007.

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